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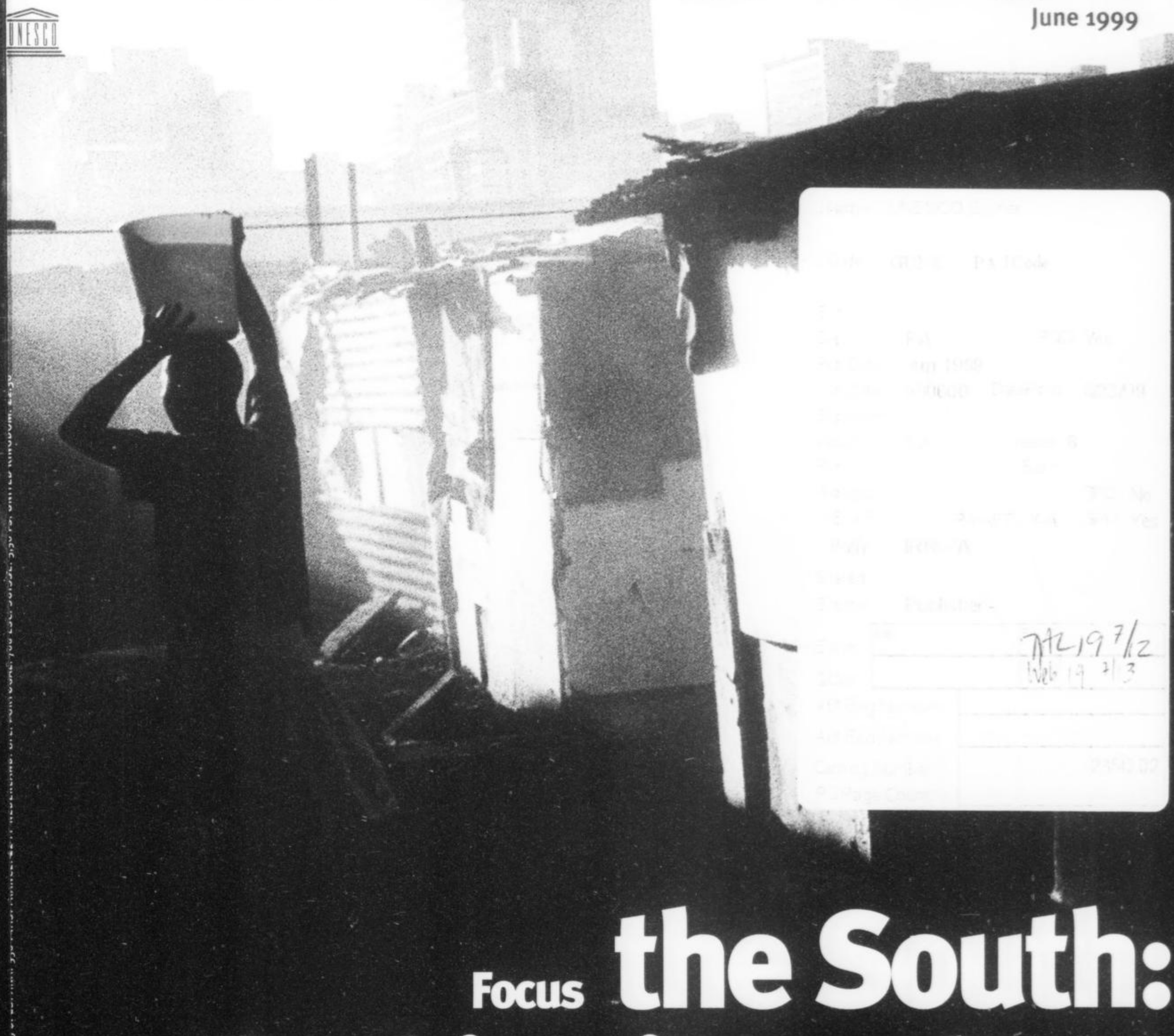
June 1999



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Focus the South: the big city or bust

Features include:

- Madagascar's **undaunted** street children
- A virtual library on the **Web**
- **Gurdev Singh Khush,** masterminding a new rice revolution

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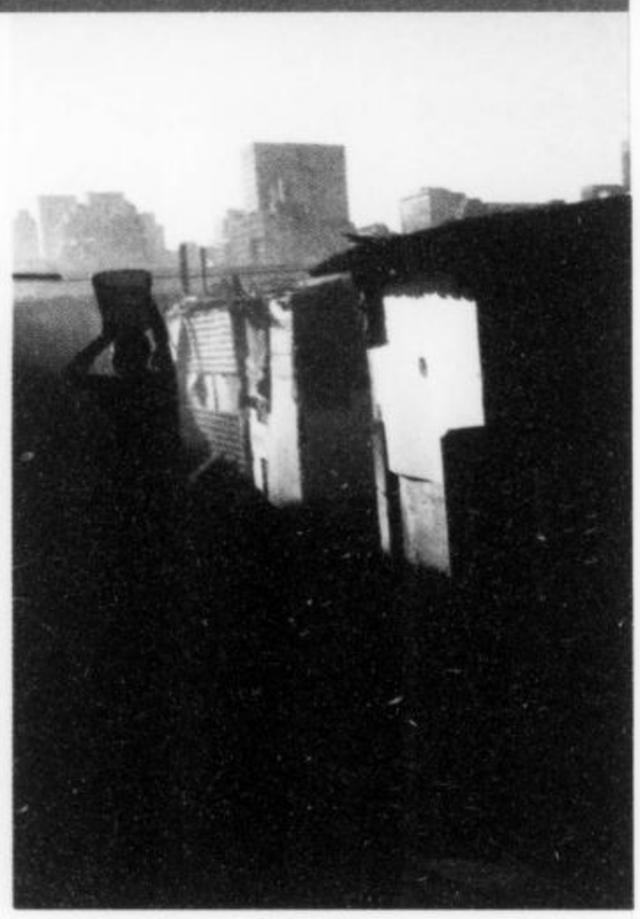
The South: the big city or bust

Unprecedented numbers of people are pouring into the towns and cities of the developing countries. How are they coping with life in mega-cities that are already bursting at the seams? Some answers emerge from reports on Lagos, Jakarta, Brasilia and Shanghai.



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Cover: A slum in Johannesburg (South Africa). Most of the people who live there are immigrants from Mozambique. © James Nachtwey/Magnum, Paris

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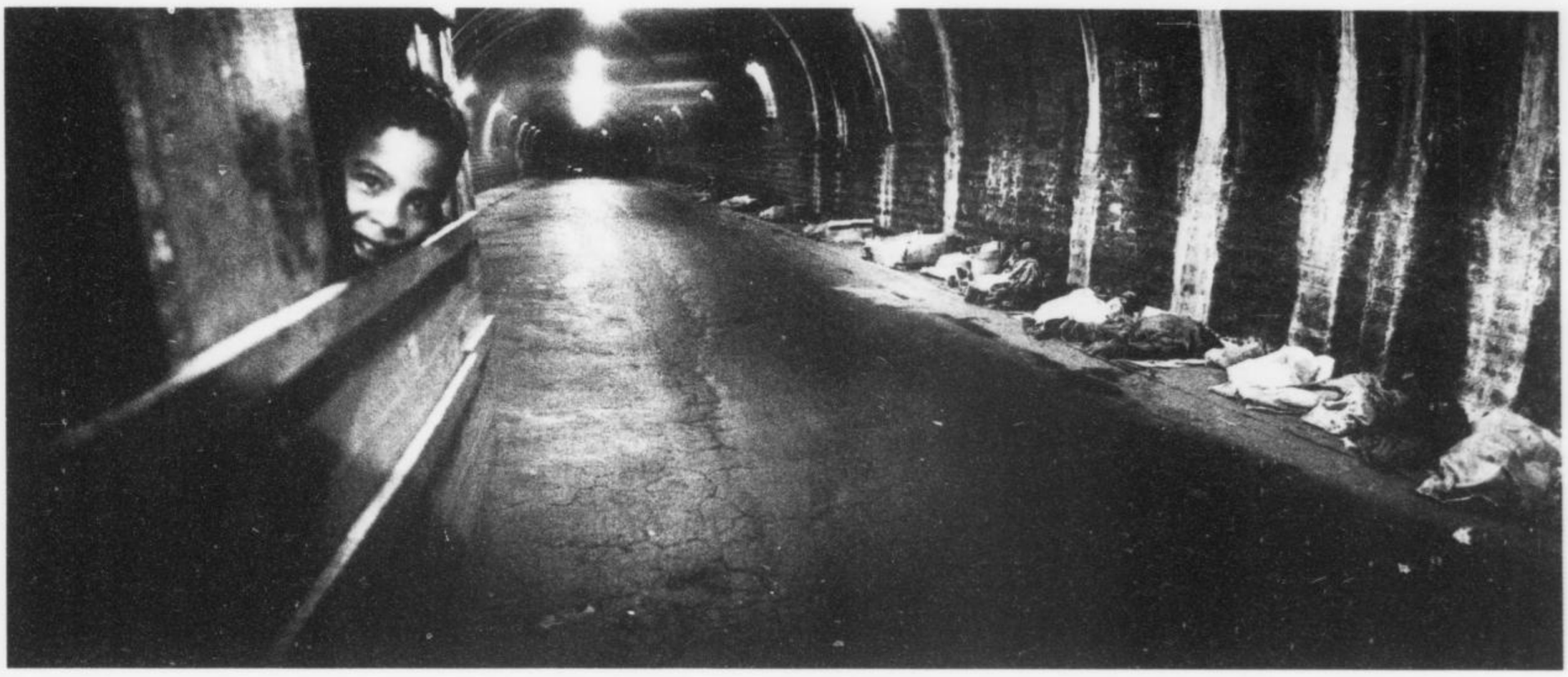


Madagascar's **undaunted** street children

Photos by Rip Hopkins

Antananarivo's *boay kely* sleep rough and live hard, but they are still children, with children's fears, laughter and high spirits

Adelson Razafy
Journalist in Antananarivo, Madagascar.

Above, blackened by exhaust fumes, the tunnel under Tana's city centre serves as a dormitory for children, especially during the rainy season.

Below, running after cars can be fun.

A late-evening downpour drenches Antananarivo, the capital of Madagascar, known as Tana for short. Huge drops thud on the outside of a cardboard box which once contained a fridge but is now propped up against a grey wall. Inside, snugly wrapped in jute sacks, Rado and Toky cling to each other and try to get some sleep.

But the floor of their "cabin" is soaked. Groping their way in the darkness, the two ▶

Photos © Rip Hopkins/Vu, Paris

▶ boys get up and sit on makeshift stools, which are in fact big stones that stop their abode from blowing away on days when the wind is strong. With his feet on the waterlogged ground and head down, eight-year-old Toky tells his story.

"This reminds me of my first night in Tana. We'd just arrived—my father and mother, my three brothers and sisters and me—when it started pouring. We slept on the ground, under a shopfront awning with other poor people. The next morning, my little sister complained that people had been groping her all night. Since then, my family has preferred to live in a cabin like ours, near the route-taxi station where my father sells maize pancakes.

"But I stay here because it's close to the market. Before we came to Tana, we lived near Anjozorobe, in the north, where my father worked in the paddy fields. He gave half of the harvest to the owner, even though he was the one who paid for the seedlings, fertilizer and pesticides. One day, the owner asked for two-thirds instead of half. That's when my father decided to leave for Tana."

The other boy, Rado, has never lived in the

Hygiene goes by the board when scraps are the only form of sustenance. Top, children rummage through fishmongers' waste.

Above and left, in Antanarivo's Analakely market, street children set up stands for traders or carry shopping for the well-to-do.

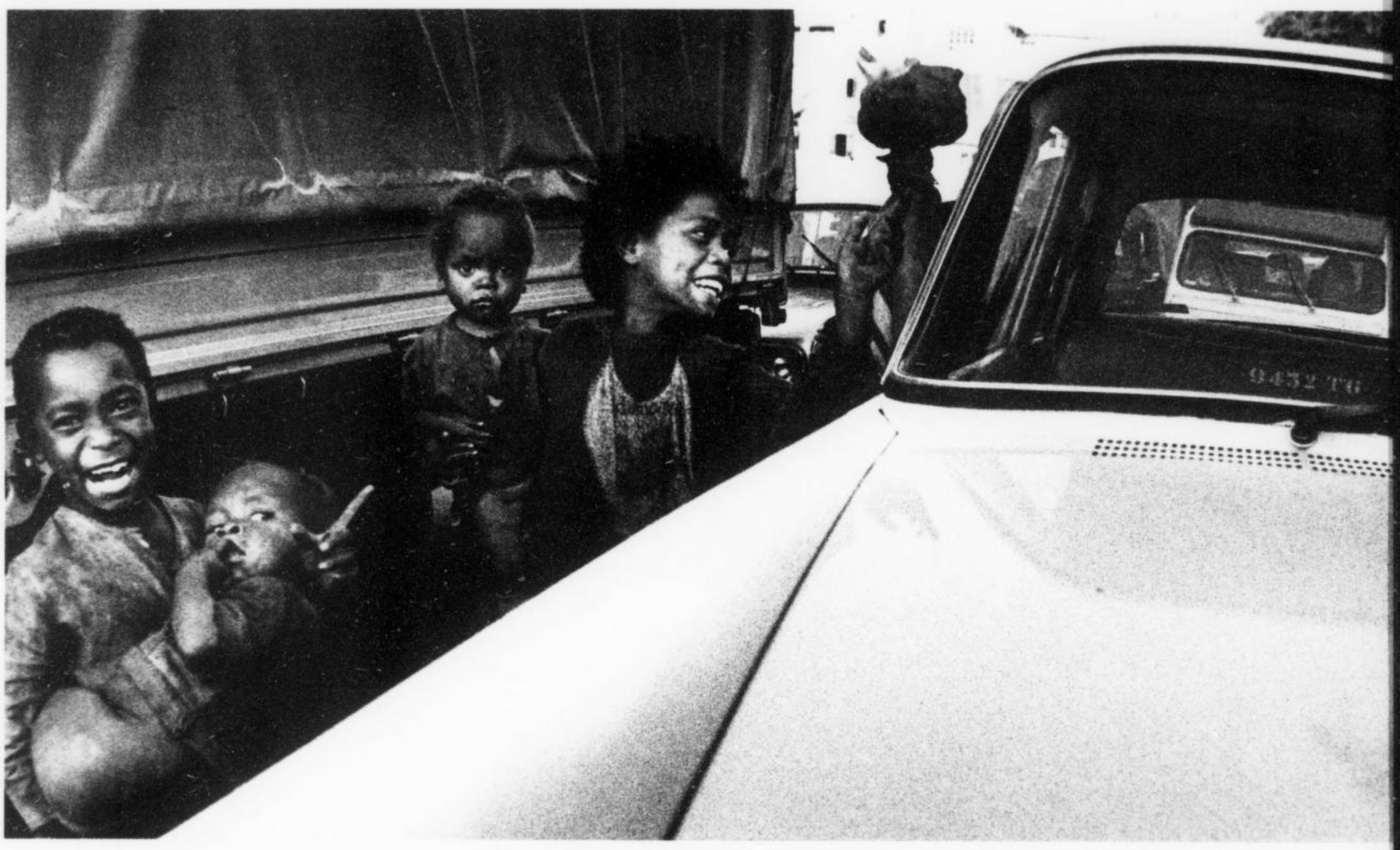
countryside. "When I was little, we lived in one room with electricity," he said. "But my father drank and didn't pay the rent. One day, we were thrown out onto the street."

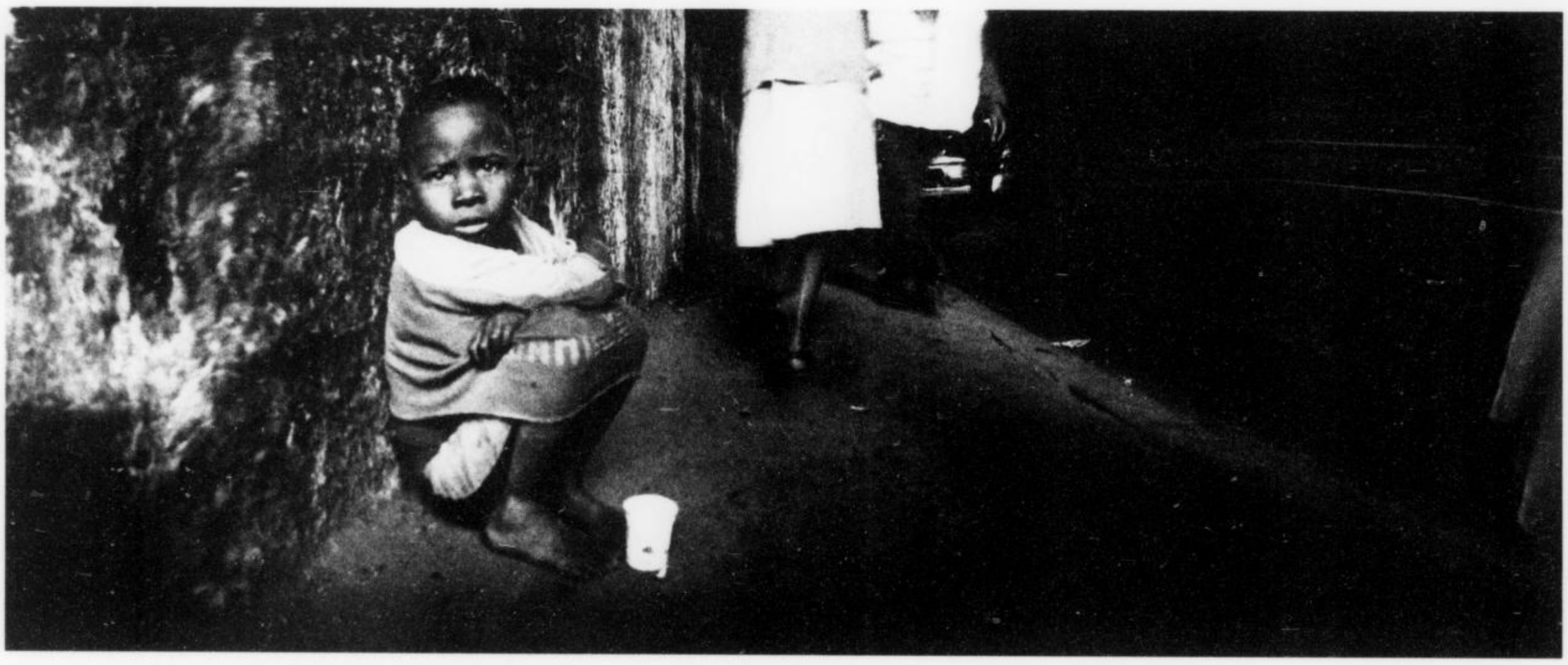
When dawn breaks, the two boys crawl out of the now-shapeless box. They will have to find somewhere else to sleep before night falls again. But this isn't the time to be looking. The market is starting up and the first trucks are arriving with goods to sell. The boys have to rush off and set up stalls for five traders who employ them. With the pittance they earn doing that, they can buy a meagre breakfast at a corner stand—some tea (in fact, hot water with sugar in it) and two rice pancakes. When business is good, they treat themselves to a cup of coffee with milk.

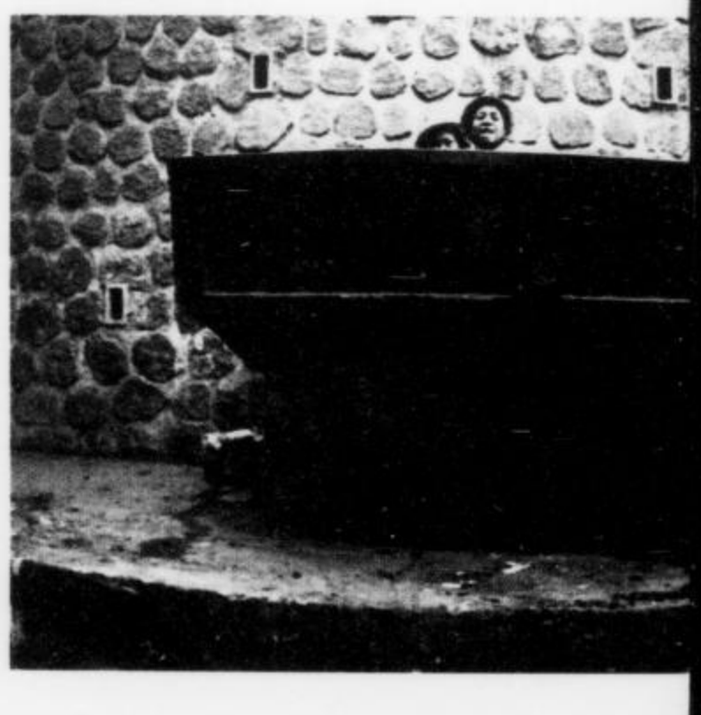
After that, Rado and Toky make for the main entrance of the market, where they mingle with a crowd of other children, all waiting for the arrival of well-off ladies in cars whose purchases they will offer to carry for a small fee. Rado knows the tricks of the trade. You have to avoid the talkative ones, who spend hours nattering to the shopkeepers, and the tight-fisted ones, who are always haggling about the price of what they buy. ▶

In waste dumps, children scavenge whatever they can find, including chunks of unused coal. Right, the dump adjoining Anosibé market in Antananarivo. Below, a smoking garbage dump on the city's outskirts, where Raoulatsh and his friends struggle to survive. Young scavengers are looked down upon as unclean by those who have managed to land a menial job.

Photos © Rip Hopkins/Vu, Paris







Photos © Rip Hopkins/Vu, Paris

Above, begging at car windows. Children with a handicap or carrying a baby are more likely to get attention.

For the youngest children, left, begging is the only means of survival.

Far left below, teenagers on the street have their own children who are left to fend for themselves during the day, when their parents go to work.

Below, playing a game of hide and seek in a skip.

Rado used to look after cars parked near the market, which was less tiring and better paid. But older children have seized control of that and chase off any younger ones who try to edge their way in. Rado also knows there are two things he will never do again—rummaging in garbage cans and begging. "The garbage boys" are looked down on as idle and dirty by the other *boay kely,* as Madagascar's street children are called. Rado is 12 years old and because he is in good health, no one takes pity on him any more.

Like all the capital's *boay kely*—which the NGO *Médecins sans Frontières* (Doctors Without Borders) estimated in 1997 to number 3,500 out of the city's one million inhabitants—Rado's worst fear is of crackdowns by city officials. The last one dates back to the summer of 1997, when there was a clean-up before the Jeux de la Francophonie, an international sporting event bringing together countries that use French as a common language. Shacks were torn down and the street children were taken off and dumped in a reception centre 50 km outside the city. But they all ran away because the rules and the staff were too strict. The children walked back to the capital, living off petty thieving along the way. After the Games ended, they were back at the market again.

Disease is another threat to street children. The oldest ones remember typhus. But not Rado. He survived the bubonic plague epidemic which occurred in 1997-98. The disease first broke out in a slum just below the market and then gradually spread among the street children. Some of them watched as the fatal swellings twisted their arms. The health authorities responded by knocking down all the shacks and dousing the area with clouds of chemicals. Many of the children died. Rado was shocked by what survivors told him when they returned from hospital—that the nurses and women attendants had balked at treating the sick children, who were dirty and smelly and not in a position to give them a tip.

Are the *boay kely* condemned to spend all their lives on the streets? Probably. The ▶

A **lost** generation

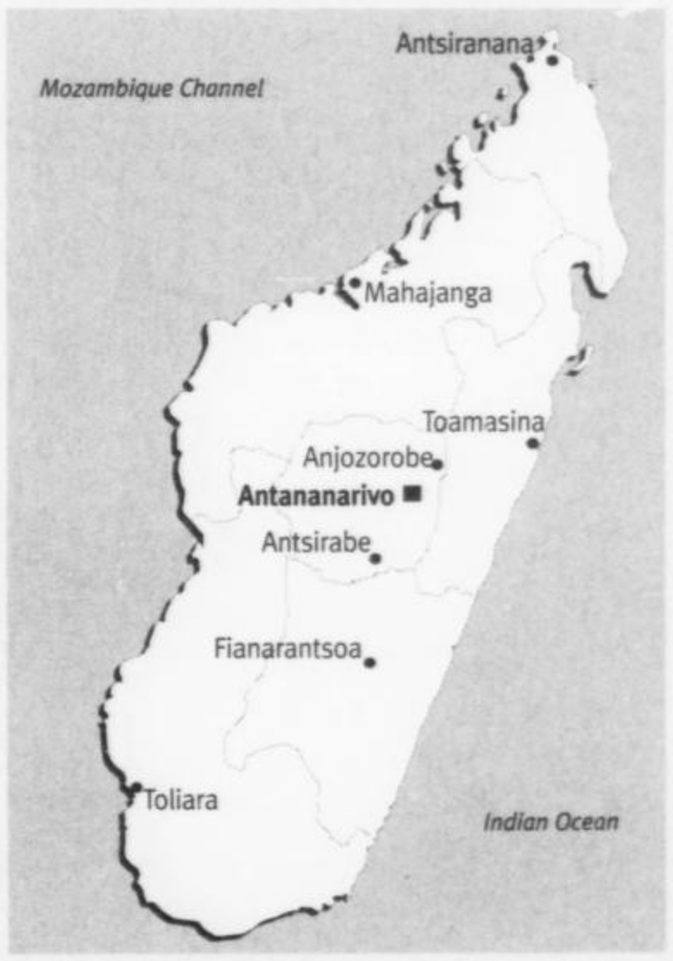
If there is one country where the term "lost generation" means something, it's Madagascar. The 45% of its 14 million inhabitants who are under 15 will confirm that. Since the time they were born, the economy of their island, in the Indian Ocean off the coast of Mozambique, has steadily deteriorated.

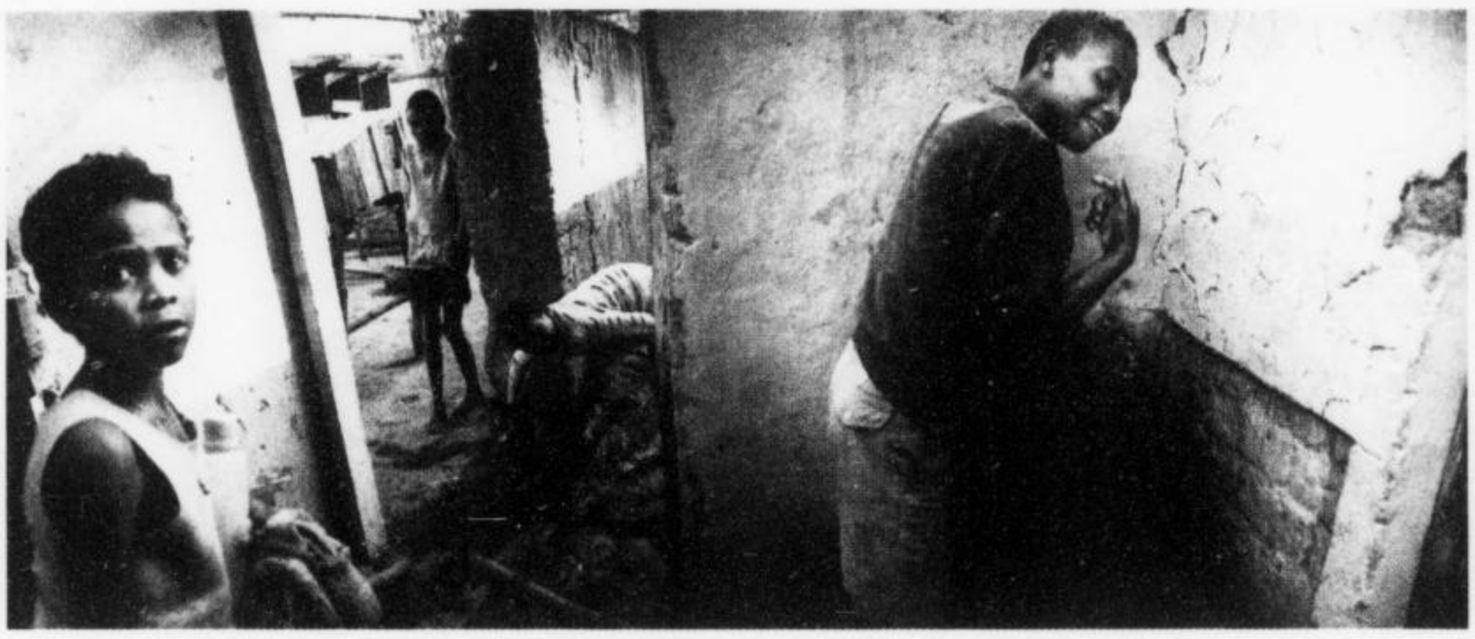
Between 1980 and 1995, per capita income shrank by an average 3% every year, according to UN figures. Daily calorie intake per person has fallen by 22% since 1970 and 34% of children under five are malnourished. A recent study by the country's national statistics institute, Instat, showed that nearly half the infants below the age of three suffer from retarded growth—the highest proportion in Africa—and that one child in six dies before reaching the age of five.

Education figures for the island—which, at 592,000 sq km, is the fourth largest in the world—are just as gloomy. School attendance between the ages of 6 and 23 nearly halved, from 60% to 33%, between 1970 and 1995, and nearly three-quarters of all schoolchildren fail to complete primary school.

Today, 72% of the Malagasy live on less than a dollar a day, despite the fact that their land has abundant agricultural and mineral resources. The island also has tremendous tourist potential. In 1997, the country's foreign debt reached $4.4 billion—120% of gross domestic product (GDP). This disastrous economic situation is the result of several decades of political turmoil and administrative disorder.

Things have been a shade better since 1997, when the economic growth rate (3.7%) topped population growth (2.8%) for the first time in many years. The upturn was maintained last year. Many credit the improvement to the rapid switch to a market economy and a democratic system after a long period of "true socialism". But in Madagascar, as elsewhere in sub-Saharan Africa, the remedy of liberalism may not be enough to roll back poverty. ■





► girls often end up as prostitutes and the boys doing odd jobs. The porters, car washers, illegal vendors, barrow haulers, water carriers and pickpockets were all once street children. Do-gooders like Lazarist priests or NGOs which campaign against child labour try to change their lives by sending them to school. But the children often rebel. How can they do "homework" when they have no home, no table, no light? What's the point of "doing nothing" in school all day when there's nothing to eat at the end of it?

Rado knows he will never escape his present condition. He envies the few *boay kely* who have been adopted by foreign families. Sometimes photos get passed around among the boys at the market—pictures of well-fed youngsters posing with a grin in front of some place like the Eiffel Tower. Rado has no chance of that happening because he's older than eight, the maximum age for adoption.

But he can still laugh and have fun. Passers-by are always surprised that the *boay kely* are cheerful. They live from day to day and don't worry too much about the future. For them, a good day is one when they eat. And as this good fortune is often enjoyed inside the likes of an empty refrigerator box, they laugh as much—if not more—than in a fancy villa. ■

Top, during the week, Dominique and Emma live in the street. On Sundays, they visit Emma's parents, in a slum on Tana's outskirts.
Above, a detention centre in Ambouimangakely. This institution finances itself by raising chickens, which are tended by the detained teenagers.
Below, children swing on the gates at the entrance of Antananarivo's central park as they wait for passersby.

Photos © Rip Hopkins/Vu, Paris

Cities, citizens, and **civilization**

UNESCO/Ines Forbes

Federico Mayor

In 1995, UNESCO created a Cities for Peace Prize to pay tribute to city governments which have succeeded in "strengthening social solidarity, improving living conditions in troubled neighbourhoods and developing genuine urban harmony". Every two years, five cities, each from a different world region, are thus recognized.

The governance of cities has become a vital issue of our time and UNESCO's Management of Social Transformation (MOST) programme, launched in 1994, includes studies of change in urban settings which are reported back to city officials. UNESCO believes that cities, and especially mega-cities, are the laboratory of a new age where the future of humanity will be decided.

Most of the world's population will be concentrated in cities by the beginning of the next century, and the percentage of people living in urban areas will have just about doubled between 1950 and 2015. The numbers of city-dwellers will have increased fivefold over the same period, and the number of people living in cities of over a million will have grown more than eightfold. This dizzying rate of urbanization, which is going on as headlong as ever in most poor countries, upsets the natural equilibrium and the checks and balances which have always operated up until now.

Cities consume enormous amounts of energy, exhaust water supplies, and devour food and materials. In exchange, they pour out sewage and pollution. Their physical environment is worn out because it can no longer provide the input or absorb the output. And city governments are exhausted by trying—when they see fit and when they are able—to respond to the basic needs of citizens by providing such things as housing, running water, sewers, lighting and proper roads. They often prove just as powerless—or indifferent—to use for the benefit of the whole community the surplus energy and problem-solving ingenuity which citizens have. Yet this tremendous vitality is the basis of the dynamic development of so many cities today.

The words city, citizens and civilization have the same root. A citizen was originally a person who had the right to live in a city and who, by exercising rights and fulfilling duties like every other citizen, helped build a civilization.

Between pressure from below and paralysis at the top, the city has become a microcosm of the future of our civilization. It is in cities where lies the greatest danger of a shattered society where people think only of themselves. Unless we create links between all its inhabitants, the unity of a city bursts apart. It breaks up into countless groups which develop along the lines of class, race, culture and religion. Such ghettos cannot come together to form a genuine whole. On the contrary, the way they close off from each other, sometimes involving physically defending themselves against other parts of the city, creates a kind of urban apartheid.

The words city, citizens and civilization have the same root. A citizen was originally a person who had the right to live in a city and who, by exercising rights and fulfilling duties like every other citizen, helped build a civilization. This means that the humanization of cities is crucial for the future of all of us. And it is not an impossible dream. There are plenty of examples, in the North, South, East and West, where it has taken shape.

But the price is the creation of a city administration in which people can play a full part and which is based on a revival of true citizenship. Only in this way will the city serve its inhabitants by using the creative capacities of everyone—men and women, young and old, rich and poor. ■

Space law lifts off for a **new** odyssey

Amy Otchet
UNESCO Courier journalist

As commercial interests and international partnerships dovetail in space exploration and use, space law will have to be rewritten to cut a way through an increasingly dense legal thicket

Send up a satellite, haul an asteroid onto it and ship it to the earth . . . . This may sound like science fiction, but it's on the agenda of an American industrialist bent on being the world's first proud owner of a celestial body. What's to stop him, apart from the cost? How do things stand legally, for example? According to international space law, no one can lay claim to a celestial body. But if he manages to get his asteroid down to earth, it will have ceased to be a heavenly body and space law won't apply.

As technological development opens up commercial possibilities in space, a Pandora's box of legal questions is ready to burst open. There is, for example, no legal definition of where airspace ends and outer space begins. So while an aircraft registered in one country needs permission to fly through another country's airspace, the situation would be less clear for a microwave-powered reconnaissance device which is being developed to fly about 30 kilometres overhead and is neither a satellite nor an aircraft.

Issues like this will take centre stage at the upcoming Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE), which will be held in Vienna, Austria, in July. Representatives from 185 states as well as industrial leaders in the field will be attending the conference, the most important international meeting on space affairs held this decade. The decisions arising from UNISPACE will shape the way we envision and use outer space. Three major issues in particular will dominate the legal discussions: space, debris, the commercialization of space, and intellectual property.

"Environmental protection" has a special meaning in space. A bolt or a nail travelling faster than a bullet at 75,000 kilometres an hour can seriously damage an expensive telecommunications satellite. An estimated two million kilos of junk are already in orbit, with about 110,000 objects between one and 10 centimetres and another 8,500 fragments even bigger. And these numbers are expected to grow exponentially. In 10 years' time 1,000 satellites will be orbiting the earth, up from 600 circulating today.

An orbiting junkyard

Yet the space debris problem may prove relatively easy to resolve because it directly concerns major powers with the biggest investments in space hardware like the U.S., Russia and France. "We've already had at least one major accident, when a piece of debris hit the French satellite, Cerise," says Dr. Kai-Uwe Schrogl, a lawyer with the German Aerospace Centre. The accident didn't cause too much of a legal ruckus, though, because the "guilty" fragment was originally from a French launcher. "But just imagine if that debris had come from a Russian or Chinese launcher."

While there is some mention of environmental protection in two of the three UN conventions governing space activities (see box page 13), there are no binding rules designed to limit debris. "The United States doesn't want anything resembling international regulations," says Schrogl, but many other countries are pushing for a UN agreement on the issue. Ironically, the U.S. is the only country with national regulations concerning space junk and, says Shrogl, the U.S. government is now in the process of strengthening these laws which are expensive to implement. It costs much more to build a satellite that doesn't shed its spent rocket boosters than one that does. "When cheaper, more polluting launchers developed by other countries begin to reduce America's competitive edge, we will find a U.S. administration favourable

A spacewalking astronaut floats in an environment increasingly polluted with debris from rockets and satellites.

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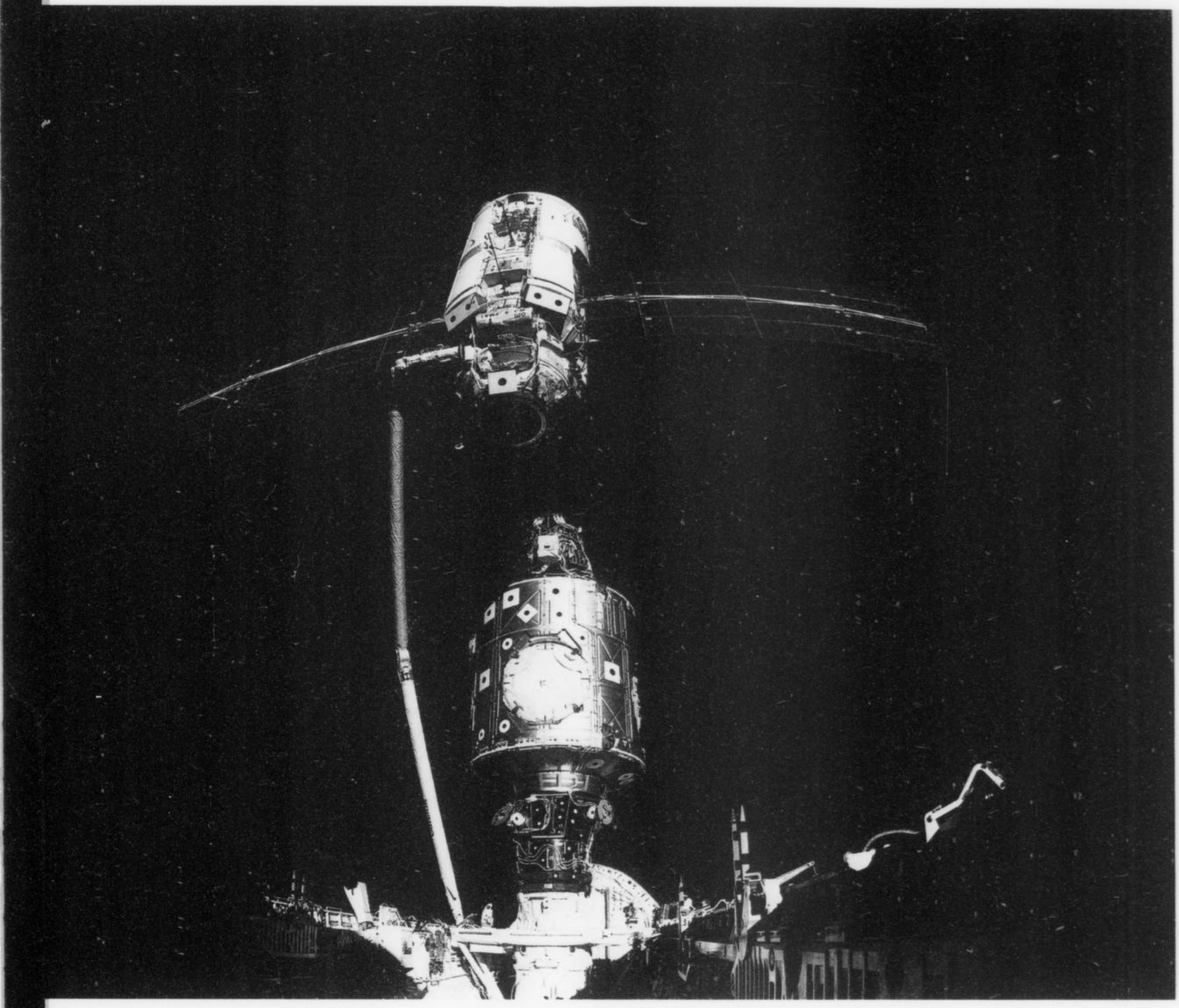


© NASA

December 1998: construction of the International Space Station begins as a U.S. node is joined to a Russian module by the crew of a Space Shuttle mission.

to international rules," Schrogl says. "The United States would prefer to see regulations set in a non-governmental forum where they can do what they like. But they'll eventually be forced to go to the United Nations."

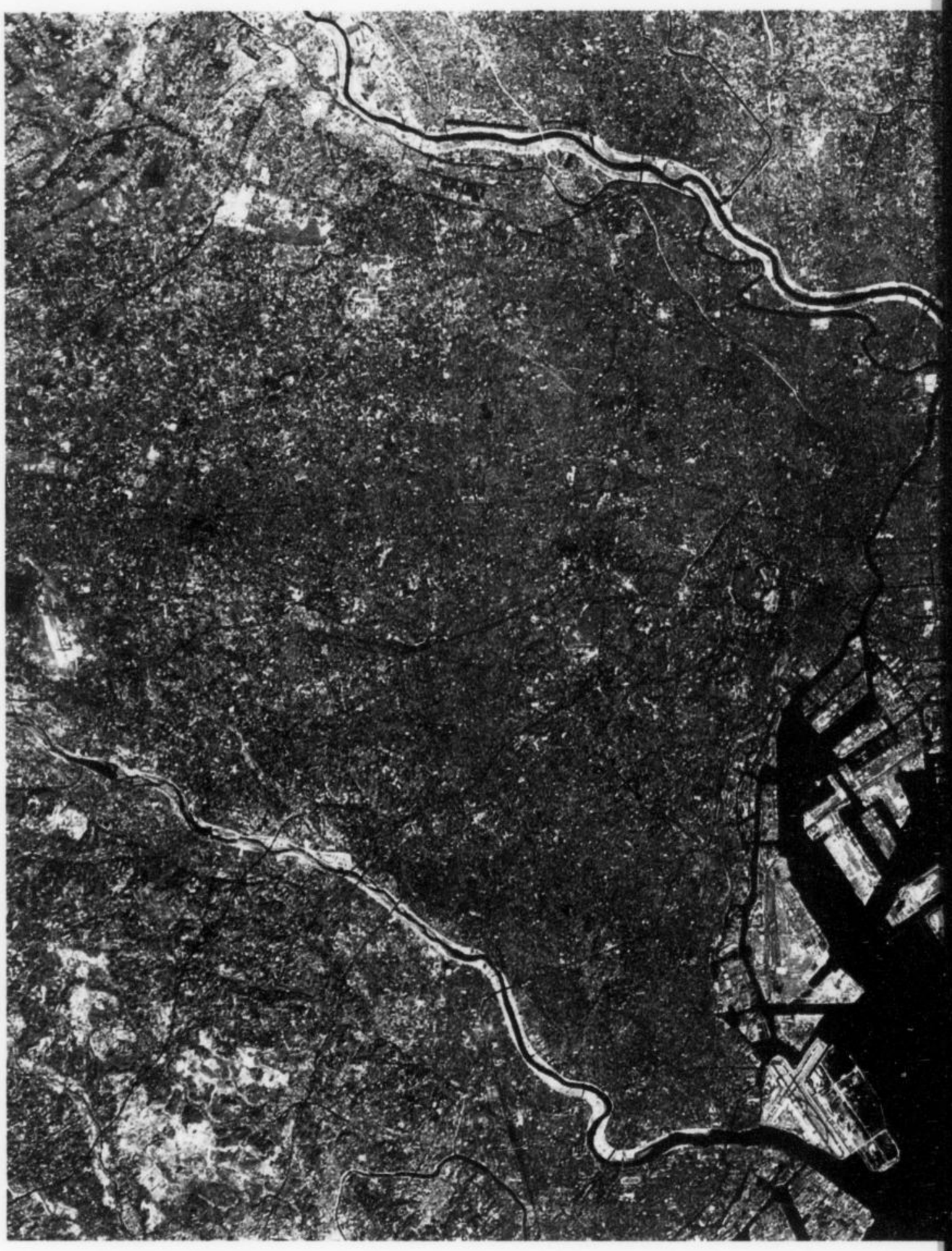
The issue of liability is highlighting a major gap in existing international space law. All the major agreements in this field were negotiated during the Cold War, when states were the sole actors in space. Today, private companies are increasingly involved in the construction, launch and operation of space objects. Yet there is no formal licensing system. As Shrogl describes the situation, it's as if countries have failed to set up a driving licence system for space traffic, thereby setting the stage for international collisions.

Consider the case of the new Sea Launch Company which is launching satellites from the high seas beyond the bounds of national jurisdiction and therefore beyond the control of governments. The consortium is registered in the Cayman Islands and consists of four partners: Norwegians, Russians, Ukrainians—each owning about 20 per cent—and the American company Boeing, which owns 40 per cent. Complicating matters further, the ship and platform used for the launches are registered in Liberia. What if a failed launch accidentally drops a rocket on a fifth country? Which government will be held responsible for ensuring that the company pays the damages?

A condominium in space

In the case of Sea Launch, the United States unilaterally decided to assume responsibility for political and economic reasons, says Dr. Frans von der Dunk, co-director of the International Institute of Air and Space Law at the University of Leiden, in the Netherlands. "If Boeing was allowed to circumvent U.S. jurisdiction, it could offer launches to China and other countries," says von der Dunk, who explains that a substantial amount of technical knowledge is passed on in the process of fitting a satellite into a launcher—a sensitive point for the U.S. While a solution was found for Sea Launch, the bottom line remains, says von der Dunk: "the law has to come to grips with the complexities of the business." Pressure is beginning to build up within the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) to develop an international agreement or at least a set of guidelines to resolve questions of responsibility and liability.

Intellectual property is also likely to attract a lot of attention at UNISPACE, especially in light of preparations to launch the International Space Station (ISS). A project involving 16 countries, the station will be the largest and most complex structure ever placed in orbit. Arrays of solar ▶



► panels with a total surface of half an acre will be connected up to a column the length of a football field comprising a series of round modules where a crew of seven will live and conduct scientific experiments. Over 40 space flights will be needed to deliver and assemble the components of the station, which will weigh about 460 tons. The ISS is scheduled for completion in the year 2004.

"It's essentially a marriage of convenience," says Dr. Ram Jakhu of the Institute of Air and Space Law at McGill University in Canada. The partner states are setting up a kind of condominium, sharing the expenses of communal services but retaining control of their individual modules. The station's lawyers have had almost as difficult a time as the engineers. They've had to iron out everything from visas and possible death certificates for astronauts to customs duties. Topping the list of technicalities has been intellectual property rights.

The ISS will provide an environment of microgravity, sometimes described as "weightlessness", giving researchers a unique opportunity to study solids, liquids and gases and the forces that affect them. This may turn out to be a goldmine, since scientists expect to make some phenomenal breakthroughs in biotechnology, research on combustible and renewable fuels, pharmaceuticals and the development of metal alloys of unprecedented strength. Pharmaceutical companies are also whetting their appetites. They have plans to grow in the ISS very pure and precisely ordered protein crystals which could be used to design new strains of very effective drugs. Imagine the scenario, says Jakhu, in which an Indian scientist is allowed to conduct experiments in Russia's research module where he or she discovers a cure for cancer. Who owns the intellectual property rights? Now chances are the two countries would broker some kind of agreement ahead of time. But that doesn't mean the Japanese, for example, couldn't copy the experiment in their module. Space is a free zone beyond the bounds of terrestrial copyright laws and bodies like the World Trade Organization.

"Should we try to apply traditional rules, which are very protective and nationalistic, or should we change the approach when the invention contains a benefit for the whole of mankind?" asks Prof. Maureen Williams, space law expert at the University of Buenos Aires. "Obviously countries and companies investing astronomical sums should be rewarded for their inventions. But should a formula with universal benefits, like a cure for flu, be licensed strictly on a commercial basis or should there be provisions to make it accessible?" Here Williams is evoking a major principle of space law embodied in the Outer Space Convention of 1967: "the exploration and use of outer space . . . shall be carried out for the benefit and in the interest of all countries, irrespective of their degree of economic or scientific development. . . ."

'Obviously countries and companies investing astronomical sums should be rewarded for their inventions. But should a formula with universal benefits, like a cure for flu, be licensed strictly on a commercial basis or should there be provisions to make it accessible?'

The question of intellectual property rights arises in a particularly acute form in the case of remote sensing, which has a wide range of applications, from monitoring deforestation to predicting mud-slides and improving agricultural irrigation. It is also a somewhat elegant way of referring to observation by satellite. During the Cold War, most countries tacitly accepted the fact that they were being watched or "sensed" but this "gentleman's agreement" is coming under increasing strain for two reasons. To begin with, the technology has dramatically improved. The old remote sensing systems only had a resolution of 30 metres or larger—referring to the amount of detail, or land area, that could be seen. The latest systems offer resolution of just one metre. Until a few years ago, these advanced systems were basically in the hands of national intelligence communities in the U.S., Russia and a handful of other countries. The technology is now

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In this false-colour satellite image of Tokyo's metropolitan area, red stands for vegetation and blue for buildings. Remote sensing systems can now capture details with a resolution of one metre.

making its way into the commercial sector, and companies are selling the information they acquire to the highest bidder. "There is particular concern that terrorist groups will be able to get their hands on detailed information about potential targets that they never had access to before," says Stephen Doyle, a former deputy head of international affairs with the U.S. National Aeronautical and Space Administration (NASA). "The groups could go through third parties to buy the data and no-one would be able to trace them."

For 10 years, developing countries have been calling for rules to regulate remote sensing which they see as an infringement of their national sovereignty. With high-resolution images, a company like Shell can explore a developing country's oil resources without even setting foot on its territory. As things stand, a company can take pictures of a country's natural resources without the country's consent and is under no obligation to share that information. The company "owns" that data and is therefore free to sell it at any price. The most the country of origin can hope to do is buy the rights to the data. If not, that country may well find itself in a situation in which another company or government that did buy the data has a better understanding of their resources than they do.

"This is a highly sensitive and political issue," says Williams. Although the UN has adopted a series of principles to ensure fair access to remote sensing data, the fact remains that countries being sensed have no right to prior consent, nor do they have a preferential right to access the data.

Uses and abuses of remote sensing

"We haven't got a very good deal, to say the least," says Dr. José Monserrat Filho, vice-president of the Brazilian Society of Aerospace Law. "We [developing countries] need a legally binding agreement to regulate remote sensing. Obviously, governments and enterprises from industrialized countries don't see the need for a new agreement. They prefer customary law" and voluntary codes or principles which, says Filho, "just maintain the status quo."

"You must be practical," warns He Qizhi, legal adviser on space affairs to the Chinese Ministry of Foreign Affairs. "If you set too high a goal, you achieve nothing." Instead of pushing for a legally binding convention, He is hoping to see "softer instruments" like declarations and resolutions designed not only to limit abuses of remote sensing but to extend its benefits. "This could be a very powerful tool for improving the environment and saving lives, particularly in developing countries. . . . The principles for this co-operation and fair access are in the existing conventions but they're just not clear or conspicuous." He is hoping that UNISPACE will spotlight the need for co-operation through declarations or principles which may later pave the way for regional or bilateral agreements.

As one positive step, Shrogl points to a new European Union policy providing scientists with access to remote sensing data while still permitting its commercial sale. "We're going to see national and regional legislation negotiated on an ad hoc basis," he says, "but we're not going to see something like the Law of the Sea. . . . The question is how to organize international co-operation, not force it." ■

UN heavyweights in space law

● **Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and other Celestial Bodies (1967)**: The most important of all space law agreements; assures the free exploration and use of space, including the moon and celestial bodies provided that these activities are for the benefit and in the interest of all countries. States are responsible for all activities conducted by their nationals. No-one can appropriate outer space. There is no explicit notion of national sovereignty recognized in space, unlike aerospace. 95 states have ratified the treaty.

● **Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (1968)**: The first humanitarian law for astronauts, this agreement obliges all states to come to the rescue of those in danger. 85 states have ratified the agreement.

● **Convention on Liability for Damage Caused by Space Objects (1972)**: With space debris a long foreseen problem, the convention essentially holds states liable for damages resulting from their space objects on earth and in space. While considered a milestone in settling disputes, it requires a substantial amount of precision especially in light of growing involvement of private companies in commercial space activities. 80 states have ratified the convention.

● **Convention on Registration of Objects Launched into Outer Space (1975)**: States are required to register every space object launched, including the object's basic orbital parameters and general function. 40 states have ratified the convention and registered about 4,900 objects, including space debris and non-operating satellites. The registry is generally seen as a weak instrument. Not all of the states operating in space have ratified it and even those that have fail to register every object launched.

● **Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979)**: Designed to assure the orderly and safe development of the moon's natural resources on an equitable basis, the agreement has failed in political terms with only 9 states ratifying it. Neither the U.S. nor Russia will sign because of an article stating that the moon and other celestial bodies are part of the "common heritage of mankind", a provision which also formed the basis of the Law of the Sea. The common heritage principle is criticized for being too vague, yet states, particularly the United States, firmly oppose any attempts to specify its provisions. ■

Colombia exports its 'new

To make up for the failings of traditional rural schools, Colombia's *Escuela Nueva* movement offers flexible and efficient solutions which are being taken up in other countries

At La Niña school, the teacher doesn't stand in front of the class dishing out knowledge. Instead he sits amid a group of pupils having a discussion with them. The children, of different ages, work not at individual desks but around hexagonal tables. The teacher doesn't deliver a lecture or give orders. Each child goes and fetches a self-instructional guide and then settles down to study. The teacher doesn't demand silence in class, because the school not only allows but strongly encourages discussion and group-work.

La Niña, in Colombia's coffee-growing Andean province of Caldas, is a rural school run according to the principles of the New School (*Escuela Nueva*) movement, which was devised by Colombian education experts who have managed to turn the disadvantages of rural schools—lack of equipment, one-room establishments and one or at most two teachers for children of different ages and abilities—into assets, providing a positive experience which instils self-reliance, responsibility and teamwork.

"The thing you notice most when you visit a 'new school' is how hard the pupils are concentrating," says Ernesto Schiefelbein, a former Chilean education minister and now rector of Santiago de Chile's Santo Tomás University, who visited the first "new school" in Colombia in 1985. "Sometimes when the bell rings for playtime, many children are so absorbed they just continue working. So learning comes easily. You also notice that they're always asking questions, which is a very good way to judge how effectively they're learning."

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Children at an Escuela Nueva in Colombia elect their school council.

Self-instruction

The watchword of the "new school" method is self-instruction based on specially-written guides (*guias*) covering maths, natural and social sciences and languages. These guides are something more than textbooks; they suggest activities and exercises that can be done both in and out of school, along with detailed instructions that enable the child to go at his or her own speed.

So pupils make progress according to their ability and the time they have available, focusing on the subjects that interest them most or which they find most difficult. At harvest time, they are allowed to go off and help their families, afterwards resuming their lessons where they left off. This has helped to reduce the amount of special coaching needed and also dropout numbers, which are considerable in Colombia's small rural communities, where between half and three-quarters of all children do not go to school or else drop out after a couple of years.

The guides have been criticized for being too structured and for curbing teachers' creativity, but they are very useful, inexpensive teaching materials that can enable a single teacher to run a one-class school. They give the teacher time to both help the youngest children to read and attend to those who have problems learning.

The critics also forget that teachers in developing countries are usually not very well trained. In Latin America, says Schiefelbein, there is "the myth of the dynamic teacher who can work wonders with kids" when the evidence is that "after six years of primary school, half the continent's children can't understand a simple article on the front page of a newspaper." The big advantage of the guides is that they can be easily followed by poorly-trained teachers and also give pupils a lot of independence.

Teacher training is a key element of the system. Teachers have to learn to use new educational tools which encourage both the pupils and the community to get involved. They also have to drop the teacher's traditional authoritarian role as a transmitter of knowledge. Each year teachers attend three one-week workshops, and visit a demonstration school to "learn by doing" and see the advantages of the new method with their own eyes.

As well as using guides, the teacher and pupils organize "learning areas" where they collect information and objects related to classwork and other aspects of daily life. For example, a natural science topic may involve having an area with sand where local plants and insects are kept.

Another novelty of the New School movement is the "school council", providing practical introduction to civic and democratic life. It is made up of committees which look after the school garden, health matters, the library, discipline and sports, and encourages co-operation and leadership based on the interests and daily lives of the children.

The La Niña school has a farming committee which organizes crop growing and

school' blueprint

Asbel López
Unesco Courier Journalist

animal breeding. "What we want is to feel proud of being country people and to learn how to use the land in a more productive way," says 13-year-old committee chairman David Cabal.

Other principles of the New School movement are that teaching must be adapted to local conditions and lifestyles. Parents and other members of the community regularly take part in school activities, improving buildings and equipment, donating teaching materials and helping teachers during lessons. In addition, they encourage the children to be interested in their own history and traditions. The guides suggest collecting proverbs, myths, legends and accounts of how people used to live. In this way, the school becomes a living source of knowledge about the community.

"The New School movement is perhaps the most successful educational reform that I've seen in more than 30 years' experience in almost 20 countries," wrote Richard J. Kraft, of the University of Colorado, in a 1997 report for the World Bank and the U.S. Agency for International Development (USAID). "The boosting of teachers' skills has brought radical changes in the curriculum, in community development, in democratic behaviour and in improved schooling."

In 1989, the World Bank singled out the Escuela Nueva movement as one of the three primary school experiments in the world which had succeeded in making educational innovations, and recommended that "the lessons of this experience be widely disseminated among policy-makers in developing countries." Since then, the model has been successfully used in Guatemala, where it has been adopted in its entirety (see box page 16). Other countries, including Chile, Argentina and recently Nicaragua, have borrowed parts of it.

The Philippines is the first country outside Latin America to use the model to improve teaching at all levels in its multigrade rural schools, which have a poor reputation. The Multigrade Demonstration Schools Project (MGDSP) has set up 24 schools in 12 provinces. It all began with a visit by Filipino officials to "new schools" in Colombia in 1993. Persy So, a UNICEF staffer in Manila, recalls that the visitors were impressed by the pupils, who were self-reliant and responsible, and freely expressed their thoughts and opinions without fear of their elders.

The children in the Filipino countryside who have been part of the programme have gained self-confidence and show greater interest in their lessons. Some parents now prefer their children to attend these schools rather than traditional schools where there is one teacher for each age group. "It's like being in a private school," says 13-year-old Adonis Corasay, who likes the fact that the village school in Begageng, in Benguet province, north of Manila, now caters for fifth and sixth-graders, meaning that he will be able to complete his primary schooling there.

In Colombia, the New School movement has survived difficulties at local and national level. A study produced in 1998 by UNESCO's Regional Education Office for Latin America and the Caribbean, based in Santiago de Chile, showed that of 11 Latin American countries surveyed, Colombia was the only one where third-grade pupils in rural schools got better marks than city children in language and maths, in spite of having fewer materials and despite the problems of ill-educated parents, geographical distance and isolation.

'What we want is to feel proud of being country people and to learn how to use the land in a more productive way'

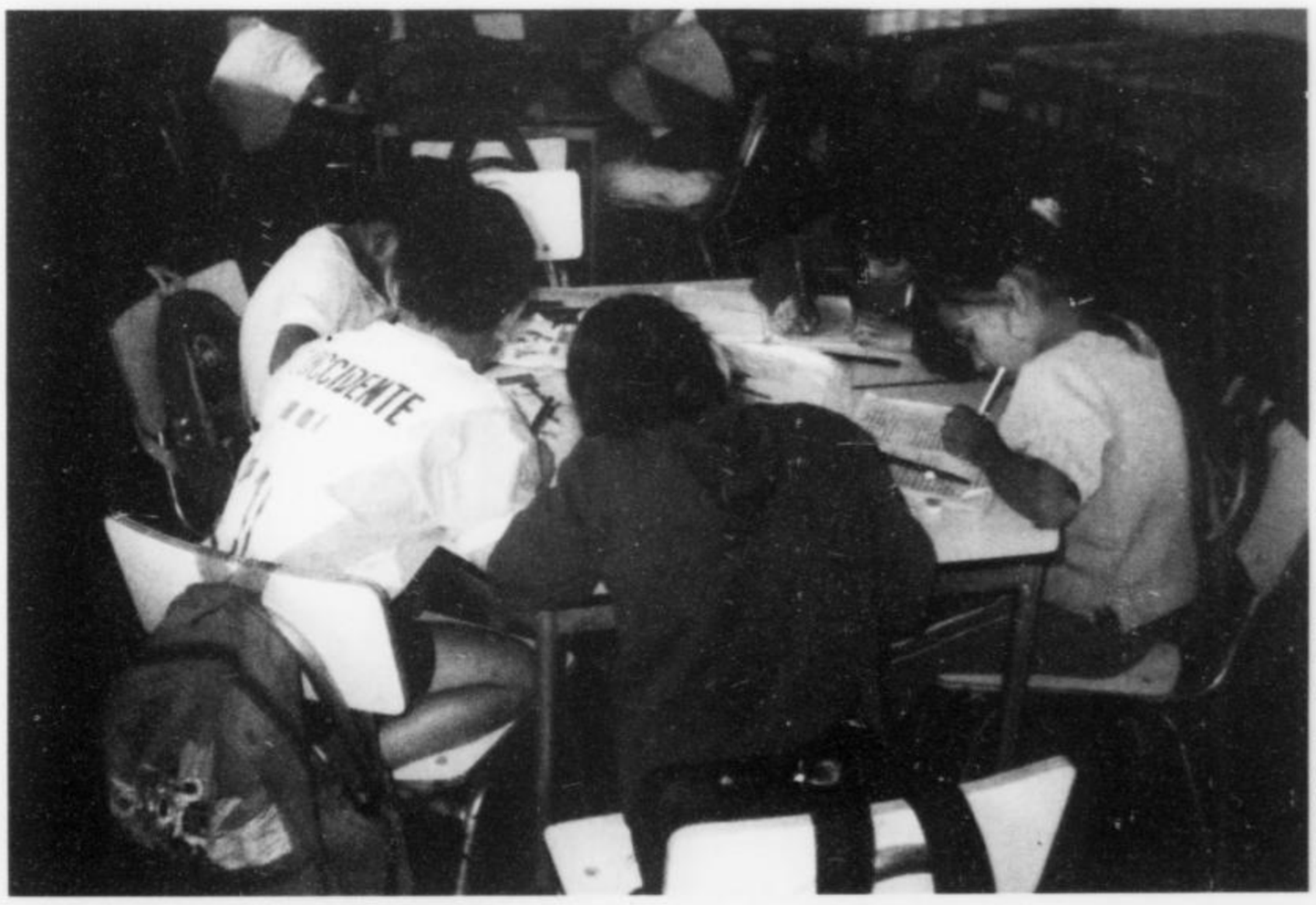
Teacher training

Rural schools in Chile and Argentina, which were also surveyed and have adopted some of the ideas of the "new schools", did not show such good results as the Colombian ones. Schiefelbein thinks this is because they haven't systematically adopted the new programme. "Chile has only taken on board a few suggestions made on five pages of a manual, and Argentina is still trying out the programme in just a handful of schools," he says.

The programme in Colombia has its critics, however. Noel F. McGinn, Professor of Education at Harvard University, notes that in its early stages, the Escuela Nueva programme "was closely monitored and nurtured by persons who were highly committed and highly talented". But as the programme expanded, it "became the responsibility of people who had only received brief training [and] may not have been fully convinced about the concept."

Some teachers may have needed training, while others, even though they grasp the new methods, are not willing to include them in their daily teaching activity. An Ecuadorian teacher, Rosa M. Torres, observed during a visit to several "new schools" in Colombia in 1992 that ▶

Working in groups and encouraging self-instruction are the hallmarks of the Colombian method.



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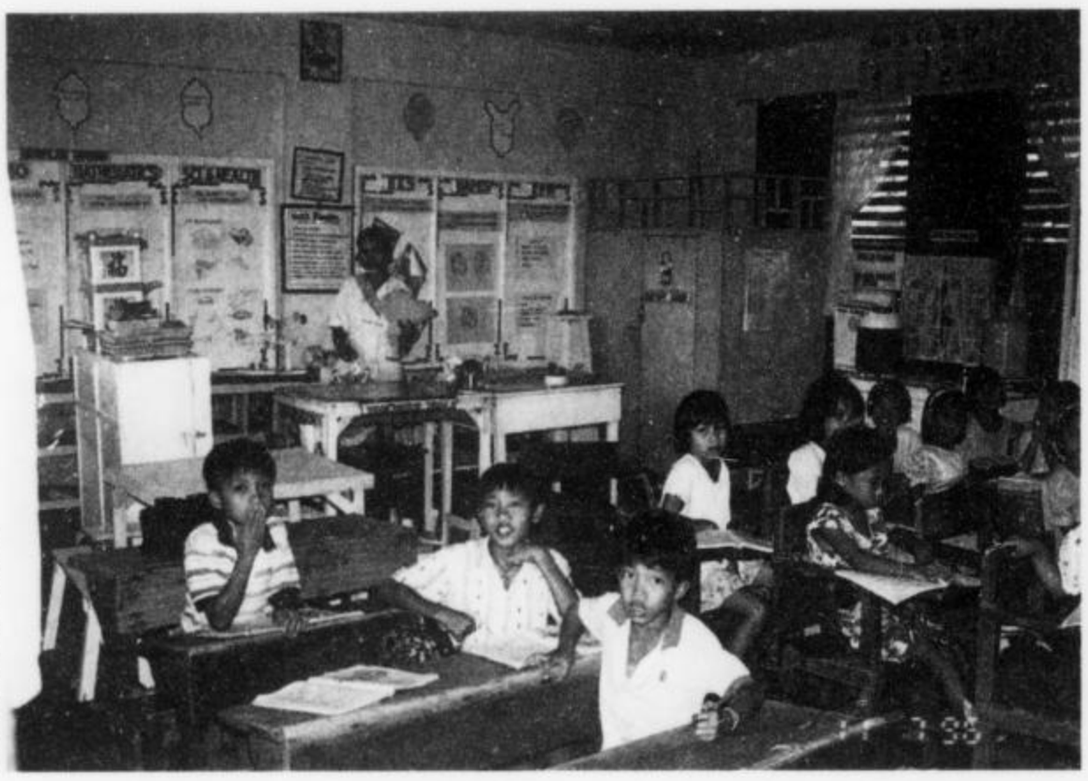

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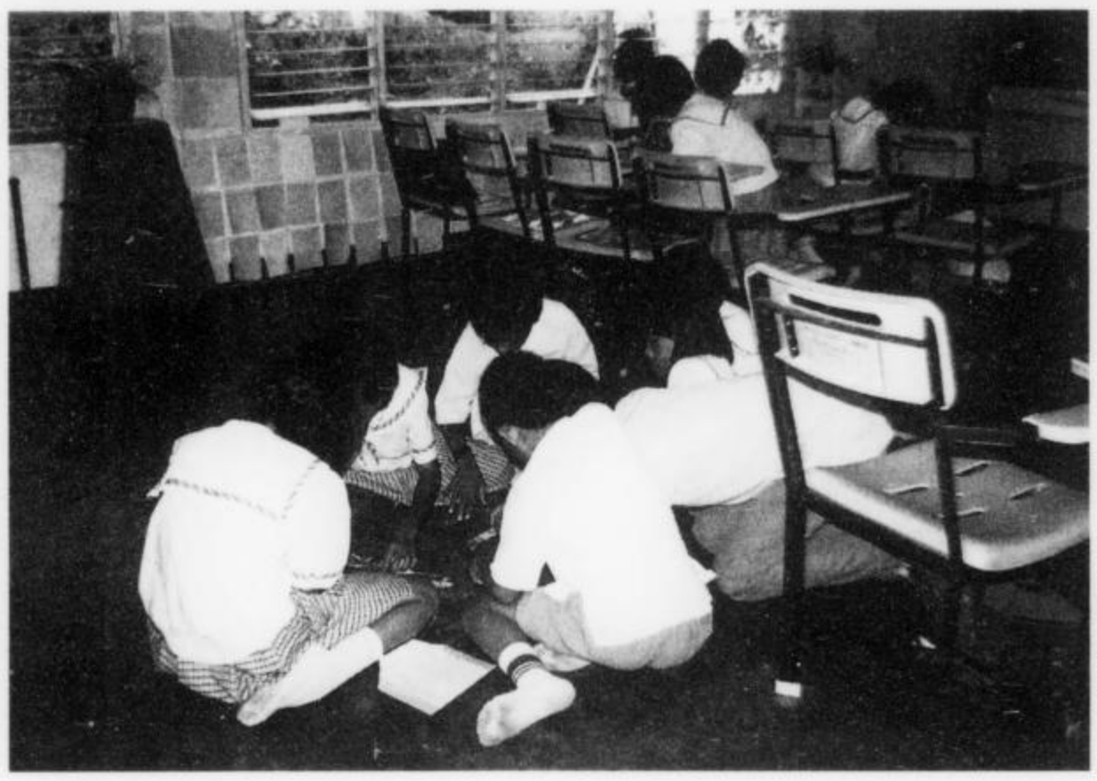

© UNICEF/DECS, Philippines

In rural regions of the Philippines, 24 pilot multigrade schools have started putting Escuela Nueva methods into practice. In some cases, the schools were built by the communities themselves.

▶ many teachers were still attached to old ways. "The ideal of progressive education coexists with conservative and outdated practices," she said.

It is hard to say how many genuine "new schools" there are in Colombia. Twenty years after they first appeared, many of them are "new" only in name. The "Volvamos a la Gente" Foundation, in Bogota, reckons there are about 12,500 schools operating according to the original principles. The number of teachers who have had some training and still apply what they learned is thought to be around 10,000, a big jump when you think there were only 150 at the end of the 1960s and just 500 in 1975.

The programme survives, despite the ups and downs of Colombian government funding, because of the tactics of the New School movement's organizers. Over the last couple of decades, every new education minister has been taken to see a "new" rural school and a traditional one. Official support for the new model has usually followed (even though it costs 10 per cent more than the traditional one) because it has the clear merits of improving the quality of teaching and reducing the numbers of teachers needed.

But to introduce a new way of educating children, "which aims not to mirror society but to change it," according to Schiefelbein, means top officials and individual teachers all have to be persuaded of its value. This is an enormous task, but a very vital one. ■

Guatemala: **motivation and multispeed learning**

Mirja Valdés
Journalist in Guatemala City

At first, some parents didn't like the new system at the "Queen of Holland" school, 138 km north of Guatemala City, because their children didn't bring homework back with them. They thought their offspring must be learning less. But their doubts soon disappeared when they saw the progress their sons and daughters were making. Now they understand that the "homework" has to do with the ongoing life of the community.

Ipólito Alvarez, who is 11, helps his craftsman father, but he is still learning even though his hands may be caked with mud, "my homework is to ask my parents about the village and its history," he says.

The school, in the village of Santa Marta, near San Jerónimo, in the province of Baja Verapaz, is one of the 2,084 rural schools which are part of the *Nueva Escuela Unitaria* (New Unitary School) project. The programme, run by the Guatemalan education ministry and based on the Colombian model, began in 1991 and now involves 3,500 teachers and about 113,000 children.

Thirty-four-year-old Oscar Guerrero has taught for 12 years in unitary schools, six of them under the new system. "Before, the children were passive, timid and didn't participate much," he says. "I'd give my daily lesson in front of the class and they just listened. When I asked them if they had any questions, no one raised their hands although I knew they hadn't understood."

Now things are quite different. The same children will pipe up with a question. For example, after following the instructions in their guide and observing a plant, Ipólito will come and ask about photosynthesis. Meanwhile, the other children are discussing among themselves what they have seen.

The shelves in the library carry about 15 books, with three copies of each. The pages are all dog-eared from being constantly used by the children year after year. As in Colombia, the school's 32 pupils have organized their own student government, which is chosen using the same system as the one used in national elections, with voter registration, electoral cards and a campaign.

The school has two classrooms, each measuring six metres by eight and divided into sections according to subject and age-group. On one wall is a map of the community drawn by the children on the back of an advertising poster. To save paper, before they start using notebooks, the first and second grade pupils learn how to draw shapes and marks in the sand.

The children are allowed to learn at their own speed, so their education does not clash with the harvest season when they have to go with their parents to the coast. If the school year ends and they haven't reached the required level, the teacher just marks their school report with the words "in process of learning". ■

● **Ernesto Schiefelbein, *Redefining basic education for Latin America: lessons to be learned from the Colombian Escuela Nueva*, UNESCO, IIEP, 1992.**
● **Noel F. McGinn, "Resistance to good ideas: Escuela Nueva in Colombia", in *Education reform in the South in the 1990s*, edited by Lene Buchert, UNESCO, 1998.**

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The **big** city or bust

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36 Urbanization and globalization
Jorge Wilheim

The number of people living in cities has doubled since 1975 and will double again between now and the year 2015. This unprecedented urban revolution, which mainly affects the Third World, is not just a question of numbers. The appearance, organization and even the function of cities have been revolutionized. Traditionally, cities have been places of meeting and exchange, but now they are splitting up into enclaves divided by walls built by the well-off and by social and ethnic barriers. In this situation, city authorities are often powerless or acquiescent (see pages 18 to 21).

In Lagos (Nigeria), ingenuity and determination are the key to survival (pages 22 to 25). Millions of inhabitants of Jakarta (Indonesia) have had to rebuild their lives after being evicted from their homes because of property speculation (pages 26 to 28). On the other hand, the authorities in Shanghai seem to be coping with an influx of four million "temporary" residents, who are however only accepted on sufferance (pages 32 to 35). Brasilia (Brazil) bristles with iron railings that protect people's privacy, as Brazilian sociologist Licia Valladares explains (pages 29 to 31).

Jorge Wilheim, one of the organizers of the United Nations Habitat II conference (Istanbul, 1996) puts these issues in a broader context of place and time. Cities, and thus our civilization, he predicts, will be shaped by the ongoing phenomenon of globalization (page 36).

Living with Leviathan

Martine Jacot
UNESCO Courier Journalist

In the year 2015, there will be 30 mega-cities with more than 8 million inhabitants—22 of them in Asia. How will they cope?

Humanity is about to set a new record. Nearly two-thirds of the planet's population will be living in cities by 2025, UN population experts say. Until now, rural people have outnumbered city-dwellers.

World population, according to the same projections, will top eight billion in 25 years' time, including five billion in cities. The increase will be particularly spectacular in the cities of the developing world, whose total population will double to four billion. We are going to see an unprecedented exodus of people from rural areas.

The demographers' predictions are only tentative of course (see box on opposite page). But the flow of people into megacities in developing countries is well under way. Several sociological changes are behind it.

Cities used to need muscle-power for the jobs they provided, the experts point out. But today they no longer attract people just because of their economic potential. "There's plenty of evidence that they can go on steadily attracting people even when the job-generating sectors are in bad shape or disappearing," says Philippe Haeringer, a research supervisor at the French Scientific Institute for Development in Co-operation (ORSTOM).

People no longer move to urban centres because they are fairly sure to find work. They do so because they want to leave the countryside where there are too many people tilling the land and because they hope to leave poverty behind. Rightly or wrongly, the city seems to offer progress and freedom, a vision of opportunity, an irresistible lure.

The result is that both inside and outside cities, there are more and more squatters and poor housing. Urbanization in the developing world differs from that in the industrialized countries, says Canadian town planner Richard Stern, head of the Urban Communities Centre at the University of Toronto, in "the speed of the process, the growth of poverty, the extent of urban sprawl and the expansion of the informal economy."

© Evandro Matheus, Brazil

Fortress-type housing complexes are becoming increasingly common in all the world's large cities. Here, a high-security dwelling in Cruzeiro, one of Brasilia's satellite cities.

How are the authorities in the developing world's urban areas responding to such "invasions"? In today's deregulated world, the trend is to question the very idea of providing the general population with basic urban services, most observers note. For want of resources, cities in developing countries are increasingly abandoning their public service function.

China is still an exception to this in several ways. Officials there, in a context of rigid planning—though this has eased in recent years—are trying to prevent the influx of more rural migrants than the city economies can cope with, as the example of Shanghai shows. Can such a policy, which works fairly well for the moment, survive the political and economic changes under way?

At the other end of the scale is Lagos (Nigeria), whose expansion is chaotic. About 200 slums have sprung up in this African city. Every now and then, one of them is bulldozed without notice and without heed for its inhabitants. But Lagos survives thanks to the vibrant ingenuity of its millions of citizens. Another revealing city is Jakarta, where the authorities themselves have joined in frantic property speculation. As a result of this speculation, more than 4.5 million people have been evicted from their homes in the last 30 years, with little compensation, to make possible the construction of high-rise blocks, which sometimes stand empty.

How do the original inhabitants of a city react to the massive influx of people from outside? In more and more cities, you see smart neighbourhoods protected by guards—what Brazilian researcher Teresa Caldeira calls "fortress-cities". In these fortified enclaves, built partly in response to real or imagined lack of security, the roads, sewage system, schools and other community services are private. Outside them, public areas have been abandoned to the least fortunate members of the society and the infrastructure there is crumbling or inadequate. The middle and poorer classes also defend themselves in their own neighbourhoods. One surprising case can be found in the satellite cities just outside Brasilia, where iron railings protect the houses, from fancy villas to the humblest shack.

Will the mega-cities of the 21st century be made up of islands of "social tribes"—"anti-cities" of walled enclaves, whose wealthy residents refuse to pay taxes to provide facilities for the city's less fortunate inhabitants? Will cities still integrate their inhabitants?

"The existence of a slum means the authorities have failed," says Anthony Pellegrini, an urban development expert at the World Bank. The bank encourages projects where the state and the private sector join hands to help the less fortunate buy plots of land in areas with an infrastructure. Other experts say the "anti-social" aspects of globalization should be blamed. They would like to see the big cities of the next century return to their original function as a crossroads and a meeting-place. ■

There are hardly any open spaces left on the globe.... The planet has turned into a boundless world city.

Yakov Okunev, Russian writer

Mexico City – those confounded demographers

Medium or long-term predictions about population sometimes turn out wrong. One of the most flagrant examples is that of Mexico City. In the 1980s, demographers warned that it would have between 22 and 30 million people by the year 2000, making it the world's biggest urban area, ahead of Tokyo.

But the Mexican capital today has "only" 17 million inhabitants. According to recent reports by the College of Mexico and Mexico's National Population Council, the city's average annual population growth rate fell from 5.06% in the 1970s to 2.59% in the 1980s and 2% since 1990. What happened?

First, the experts overestimated the city's population at the time of the 1980 census and underestimated the drop in fertility, which fell from 45 births per 1,000 women of childbearing age in 1965 to 28 per 1,000 in 1992. Mexicans were also discouraged from emigrating to the capital by other factors, including the 1985 earthquake which killed more than 30,000 people there, and worsening air pollution. Thousands of firms were induced by grants to move from the capital to smaller cities. They took their jobs with them.

So the flow of people was reversed. Mexico City grew in the 1980s at the rate of about 1,500 people a day, but from 1992 on there was a net loss of population. In that year, 661,000 people left the capital and fewer than 171,000 came to live there.

Mexico City stands on the site of the former Aztec city of Tenochtitlan, whose 60,000 inhabitants made it the world's biggest urban centre at the time of the Spanish Conquest in the 16th century. Today's estimates suggest it has lost this title forever. It is expected to stay below the 20-million mark until 2015, when it will be only the world's seventh largest urban area. This is a great relief to the authorities, which were facing a crisis of excessive and chaotic growth. The city's population has increased tenfold since 1940, when it was only 1.7 million, and its area has grown from 500 sq km in 1940 to today's 4,500 sq km. ■

The urban explosion

The increasing number of mega-cities of more than eight million inhabitants illustrates in itself the major demographic and geographical trends of the past century. In 1950, only two cities, London and New York, were that size. In 1900 they were the world's most populous cities, followed by Paris. In 1975, there were 11 mega-cities, including six in the industrialized countries. In 1995, there were 23, most of them (17) in the developing countries. In 2015, the projected number of mega-cities is 36, 30 of them in the developing world and most (22) in Asia.

Urbanization is taking place at different speeds on different continents. In North America, the number of city-dwellers overtook the rural population before the Second World War. In Europe, this happened after the war and in Latin America at the beginning of the 1960s. Today, these three continents are almost equally urbanized (75% of Europeans and Latin Americans are city-dwellers and 77% of North Americans, according to UN estimates for the year 2000).

A similar process is occurring in Africa and Asia, which are still mainly rural. Their proportion of city-dwellers rose from 25% in 1975, to 35% in 1995 and a little more than 37% today. The turning point, when the figure will top 50%, is predicted for around 2025.

In terms of numbers, the world's city-dwellers in 2025 should total 307 million in North America, 566 million in Latin America, 572 million in Europe, 752 million in Africa and 2,507 million (2.5 billion) in Asia. In 2015, the world's six biggest cities are expected to be Tokyo, Bombay, Lagos, São Paulo, Dhaka and Karachi.

Experts say the rate of population growth will eventually decline everywhere, but once again at very different speeds. Between 2005 and 2010, annual population growth rates are predicted to be 3.82% in Africa, 2.59% in Asia, 1.68% in Latin America, 1.06% in North America and 0.24% in Europe. ■

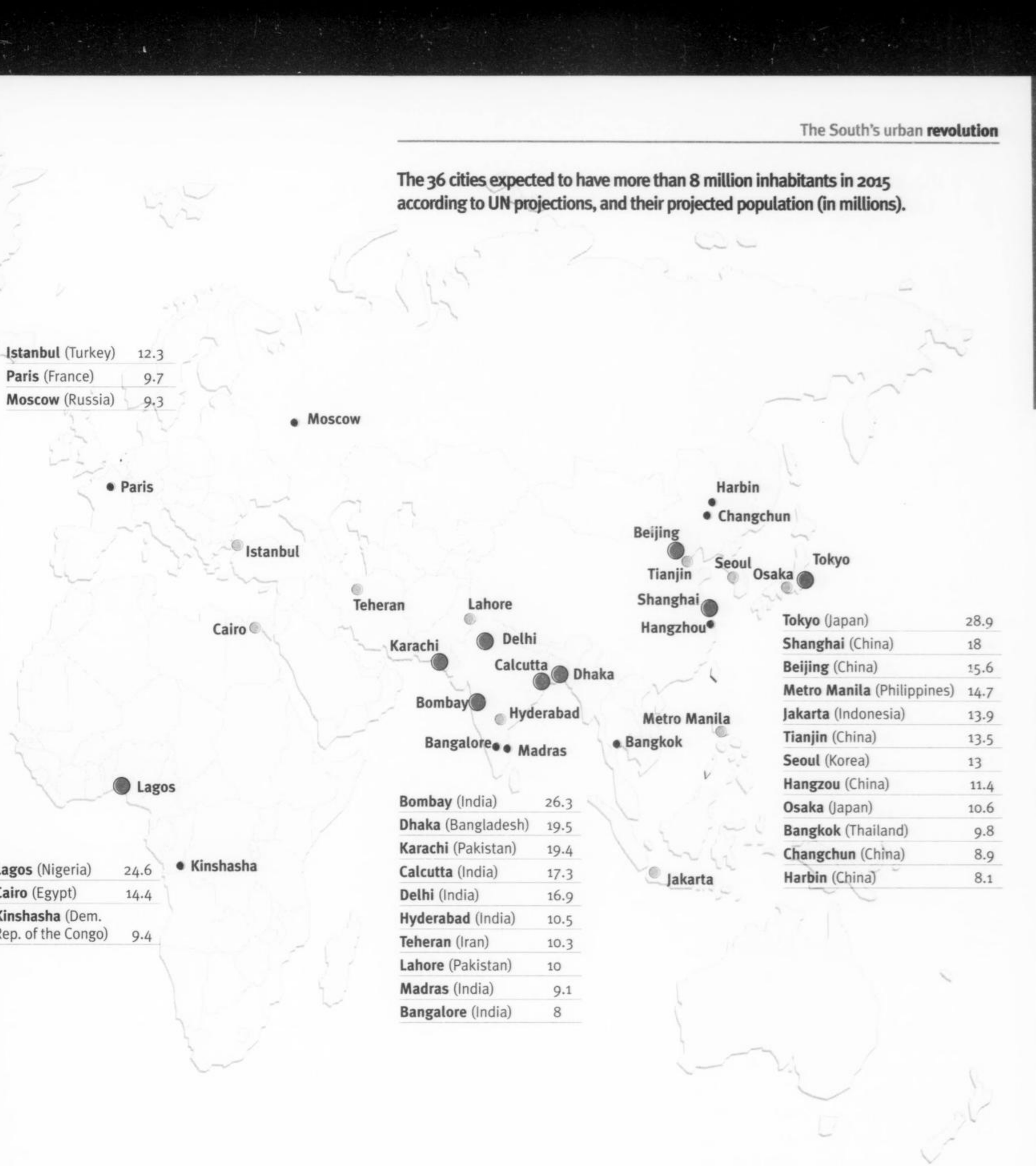
São Paolo (Brazil)	20.3
Mexico City (Mexico)	19.2
New York (USA)	17.6
Los Angeles (USA)	14.2
Buenos Aires (Argentina)	13.9
Rio de Janeiro (Brazil)	11.9
Lima (Peru)	9.4
Bogota (Colombia)	8.4

Number of mega-cities (more than 8 million inhabitants)

	1975	1995	2015
World	11	23	36
More developed regions	6	6	6
Less developed regions	5	17	30
Africa	0	1	2
Arab countries	0	1	1
Asia	4	13	22
Europe	2	2	3
Latin America and the Caribbean	3	4	6
North America	2	2	2

Source: *World Urbanization Prospects*, UN, New York, 1998

The 36 cities expected to have more than 8 million inhabitants in 2015 according to UN projections, and their projected population (in millions).



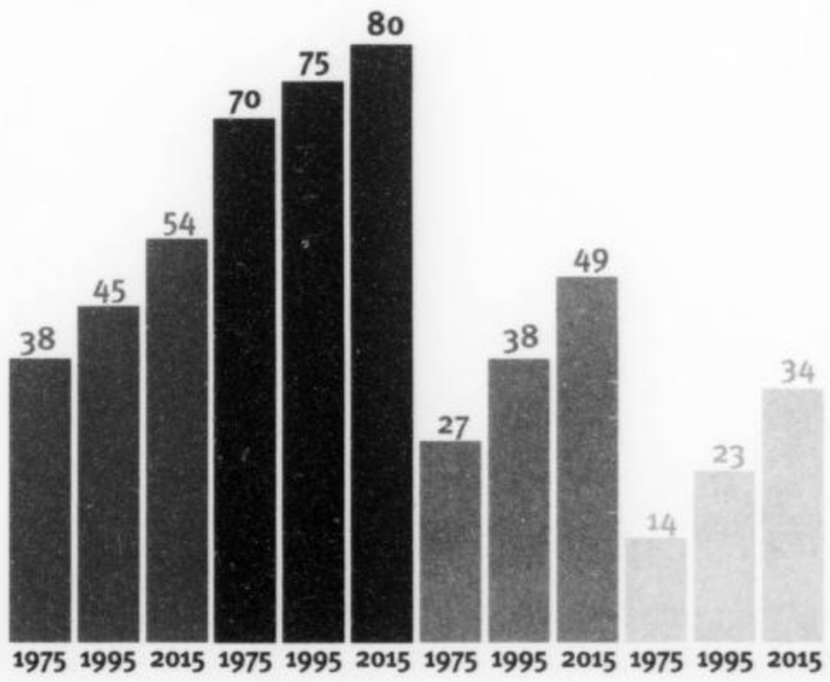
Istanbul (Turkey)	12.3
Paris (France)	9.7
Moscow (Russia)	9.3

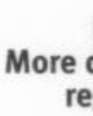
Tokyo (Japan)	28.9
Shanghai (China)	18
Beijing (China)	15.6
Metro Manila (Philippines)	14.7
Jakarta (Indonesia)	13.9
Tianjin (China)	13.5
Seoul (Korea)	13
Hangzou (China)	11.4
Osaka (Japan)	10.6
Bangkok (Thailand)	9.8
Changchun (China)	8.9
Harbin (China)	8.1

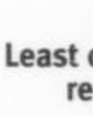
Bombay (India)	26.3
Dhaka (Bangladesh)	19.5
Karachi (Pakistan)	19.4
Calcutta (India)	17.3
Delhi (India)	16.9
Hyderabad (India)	10.5
Teheran (Iran)	10.3
Lahore (Pakistan)	10
Madras (India)	9.1
Bangalore (India)	8

Lagos (Nigeria)	24.6
Cairo (Egypt)	14.4
Kinshasha (Dem. Rep. of the Congo)	9.4

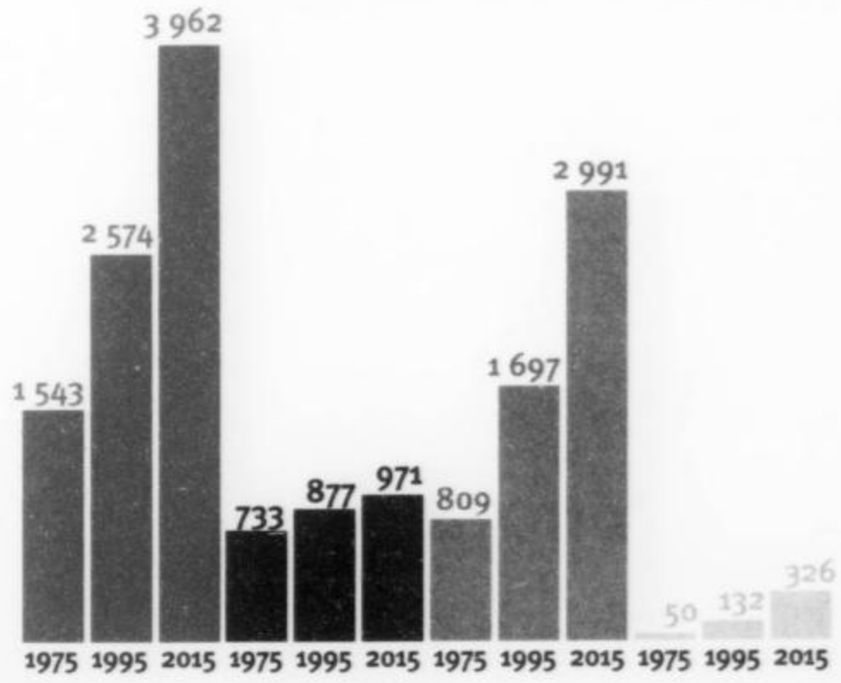
Population living in urban areas (percentage)







Population living in urban areas (millions)



Source: *World Urbanization Prospects*, UN, New York, 1998

Lagos: the survival of the determined

Amy Otchet
Unesco Courier journalist

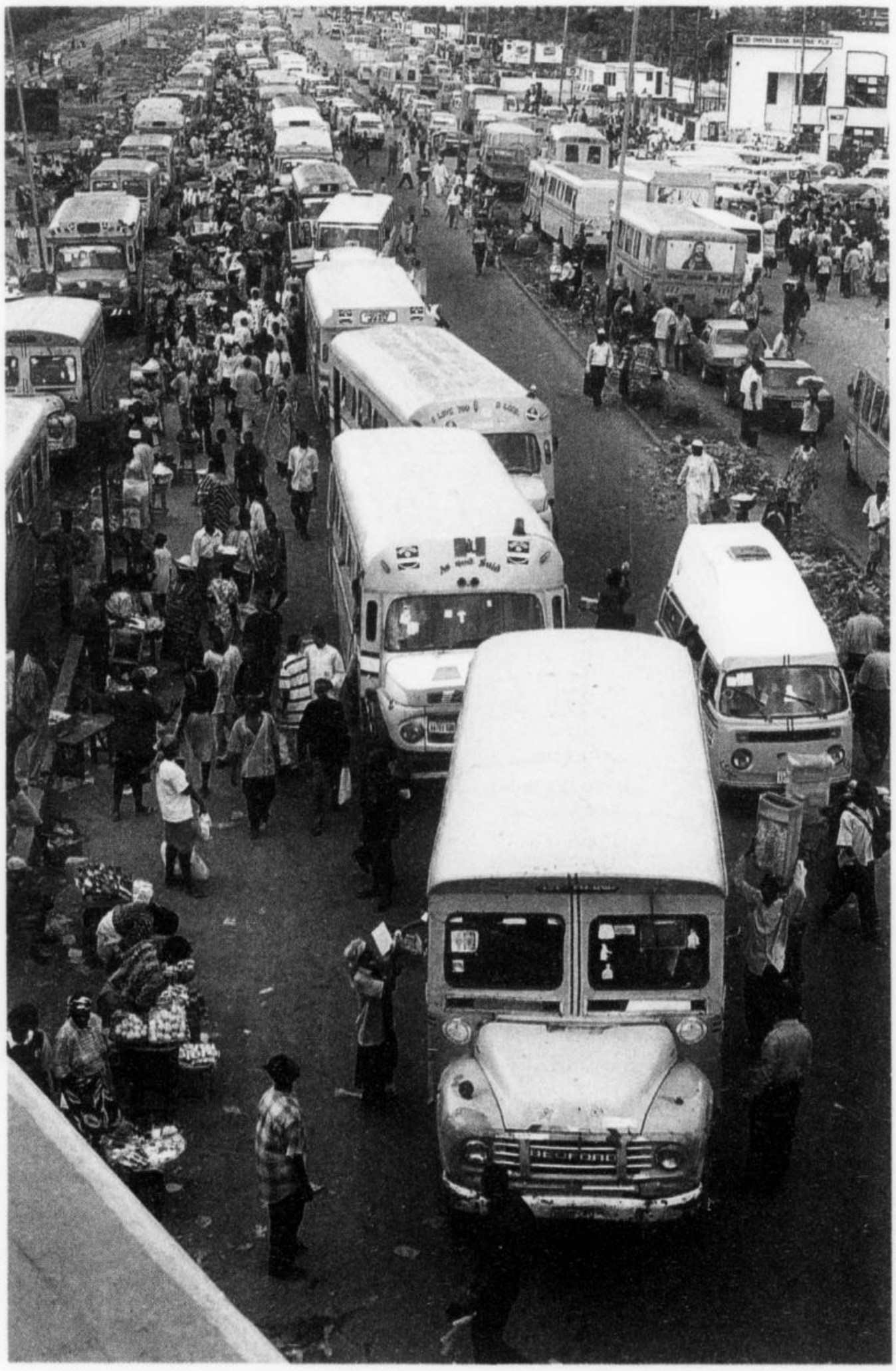
Lagos is a city where near anarchy prevails rather than government. Lagosins respond to the chaos by relying on their own ingenuity to get by

It's rush-hour near the stadium in Lagos where Nigeria has just lost a football match. Streams of young men run through the street to let off steam as crowds dive into the tangle of battered yellow minibuses. A dozen passengers pack into one bus, and the driver grinds into gear, lurching at full throttle to gain a six-inch lead over his competitor. The side-view mirror has to be pulled in for the bus to squeeze through. Girls balancing bags of water on their heads edge their way through the traffic to vend their wares. Toilet brushes, cutting shears, smoked fish, hankies, inflatable globes and even a steering wheel are sold by boys as the coil of traffic becomes ever more ensnared. But the action never stops for a moment. That's Lagos—a city that moves, miraculously, against the odds.

A mighty magnet

It's difficult to find the centre, let alone the logic, of this city reputed to be the most dangerous in Africa. Three bridges connect about 3,500 square kilometres of lagoon, islands, swamp and the mainland, where unlit highways run past canyons of smouldering garbage before giving way to dirt streets weaving through 200 slums, their sewers running with raw waste. So much of the city is a mystery. No one even knows for sure the size of the population—officially it's 6 million, but most experts estimate it at 10 million (see box)—let alone the number of murders each year, the rate of HIV infection or the quantities of drugs that pass through the port of Apapa. Corruption is endemic at all levels. A bus driver doesn't even slow down to slip a few bills into a policeman's open palm to avoid being pulled over. The rich barricade themselves on two fortress islands, removed from the mainland, where two-thirds of the population live below the poverty line.

But to look upon Lagos simply as the archetypal urban nightmare is to miss the point. Lagos, as the economic, cultural and, until 1991, political powerhouse of mighty Nigeria, is, for all its faults, also a magnet pulling some 300,000 people every year. The streets aren't all paved with concrete, let alone gold, but Lagos appears as an El Dorado in the poverty-stricken countryside where work can be found and dreams of the good life can come true. In reality, most find it a daily struggle to make ends meet, yet an iron-clad conviction that those dreams will materialize one day gives Lagos a vibrant beat.



© Ray Onwuemegbulem, Lagos

On the Apapa-Oshodi Expressway, a typical traffic jam—locally known as a "go-slow".

If you ask Lagosins about the glue that holds their city together they speak of endurance. For some, it is a capacity to withstand suffering. This helps to explain the much talked-about boom in evangelism. "People are seeking spiritual solutions to their economic problems," says Pastor Ebenezer Babajide, who opened his Jesus Generation Gospel Church last year in the annex of a nursery school. But there is a drive that goes beyond simply the will to survive.

"In Nigeria, there is a spirit to aggressively pursue the good life,which you won't find elsewhere on the continent," says Felix Morka, executive director of the non-governmental Social and Economic Rights Action Centre. The oil boom beginning in the 1970s raised expectations for a better life which people managed to hang on to, even after the economy took a nose-dive in the 1980s and the World Bank's structural adjustment policies made life more difficult. "It's as if people are struggling to reverse the economic downturn as individuals," says Morka. "Everyone wants capital to start their own business. This industriousness is very Nigerian but the struggle is even more fierce and stark in Lagos where there is such a concentration of pressures, resources and population."

Wheelbarrows rented out as beds

Instead of exploding under pressure, Lagosins have pumped that much more out of the informal structure, which Morka calls "an incredible renewable resource that has been the military government's greatest ally." This underground economy enables at least half the city's people to make ends meet. By taking the edge off economic hardship, the informal sector cuts down the potential for political upheaval.

Typical of the informal sector is the professor who earns 5,000 *naira*, equivalent to about $55 a month, and takes on a second or even a third job. Perhaps he opens a small food store to pay for his daughter's tuition fees of $85 per semester. In this vast black market, vegetables and fruit flow across the border from neighbouring Benin, their entry eased by bribing customs officials who earn about $55 a month. When the government cuts domestic fuel supplies to meet export demands, the informal sector fills the tanks of taxis and buses to keep Lagos moving. Behind this informal sector lies a powerful if not desperate spirit of initiative—wheelbarrows are rolled out of a construction site at night to serve as rented beds at 20 cents a shot for homeless seeking shelter under an overhang. When rain makes a market run with mud, kids wait with buckets of water to wash shoppers' feet for a few *naira*.

The informa! sector is where a man pushes a cart from one home to the next, making $65 per month for hauling away garbage and then earning another $55 by salvaging the reusable junk. A tanker pulls up to fill a 100-gallon water tank for $6 to the owner who then sells a bucketful for five cents. It's the barter that takes place when a baker has too many loaves left over at the end of the day or the flurry of motorcycles gathered at the street corner where buses don't stop. And it's at the heart of a basic code ruling Lagos, from the thriving fruit market to the quiet fishing community: Do It Yourself.

A maze of planks stretch into the lagoon of Ebute Metta, where about 400 wooden shacks sit on stilts over the water, removed from the surrounding soot and speed of Lagos. Naked kids swing from the planks, while women bathe and prepare the evening meal. "We built this place on our own," says Chief Johnson Aibe, by trading fish for wood from mills nearby to build homes and canoes. There are no official deeds or titles in this community. A council of elders decides who can build a new home at what price. Harsh experience has taught these people that the less interface with officialdom, the better. They used to live on the other side of the lagoon but in 1985 the government decided to demolish their homes to build housing estates that these people couldn't afford. Many lost everything, never receiving a *naira* in compensation. Their options lay in rebuilding, by their own means, on their own terms.

A town is like an animal. A town has a nervous system and a head and shoulders and feet. A town is a thing separate from all other towns, so that there are no two towns alike. And a town has a whole emotion.

John Steinbeck, American writer (1902-1968)

In some ways, Ebute Metta reflects a lost Lagos of the 1950s and 60s, when people flocking from the countryside basically built small communities within the city along ethnic and geographic lines. Today's cosmopolitan Lagos has moved past this tradition. "*Eko gbole o gbole*," an expression in Yoruba, one of ▸

Factfile

The State of Lagos spans 3,577 km² which includes the metropolitan area of about 1,183 km², of which only 728 km² is dry land. A new governor and legislator were scheduled to take control from the military administration on May 29, 1999. The area is divided into 20 local government districts (whose leaders will also be elected) which have suffered from severe underfunding.

Population

The most recent census (1991) reported a population of 5.6 million. However, it is widely discredited because many of the city's inhabitants returned to their villages of origin during the census. Experts generally estimate that the population ranges between 10 and 13 million, composed largely of the country's three main ethnic groups: Yoruba, Ibo and Hausa. According to UN projections population will reach 20 million by 2010.

History

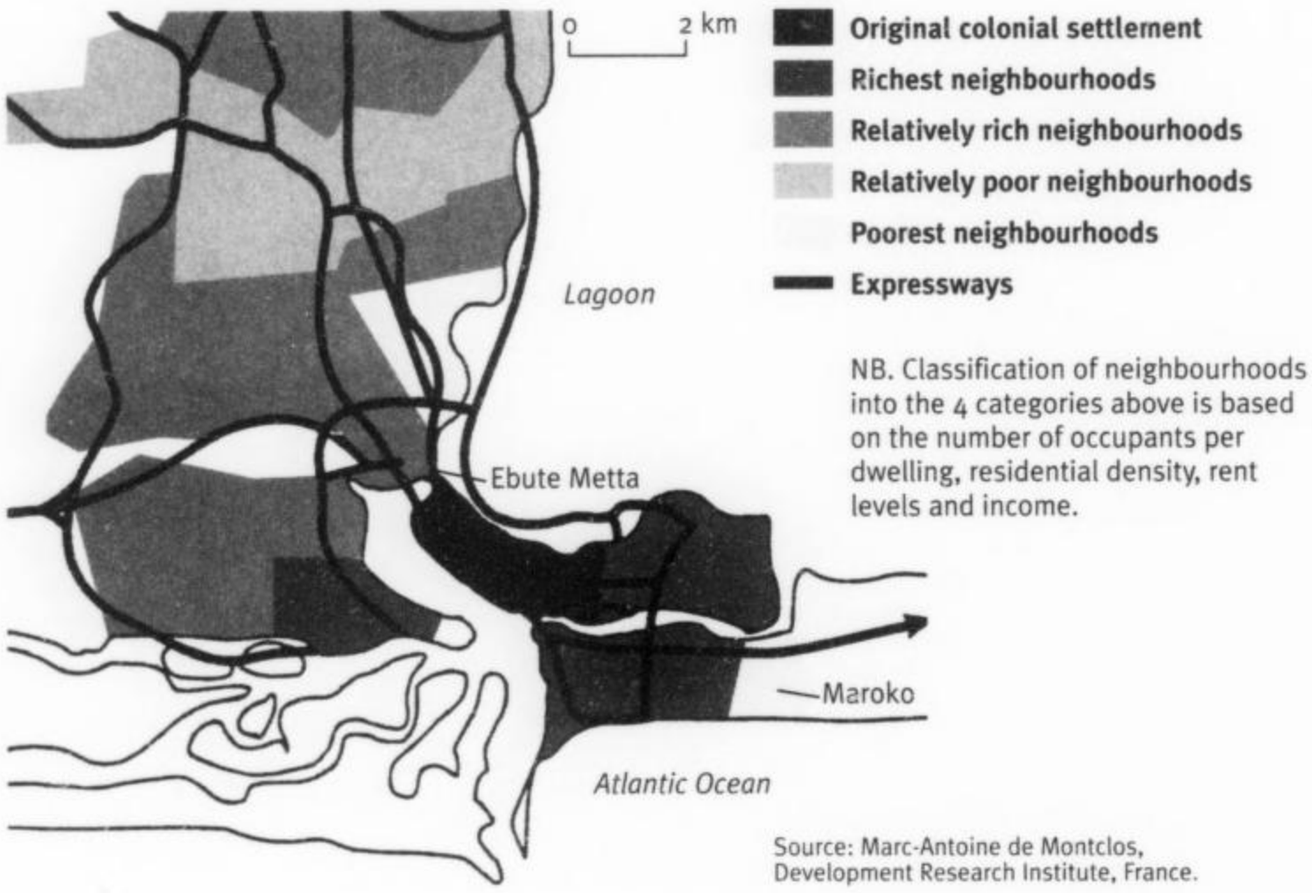
Lagos was known as Eko before the Portuguese arrived in the 15th century. Declared a British colony in 1861, the town of about 250,000 was divided into separate quarters for expatriates, the indigenous population and migrants. In 1960, Lagos became the political and economic capital of the newly independent Nigeria. By 1963, more than one million people lived in Lagos.

In 1966, the military took control of the country and a civil war broke out the following year, unleashing another wave of migration to Lagos. The oil boom of the early 1970s, in which the price for a barrel of crude rose from 30 cents to $13, unleashed a wave of irrational and corrupt infrastructure spending on, for example, a series of major highways which divide the city but fail to relieve the infamous traffic jams. The demographic and transport pressures continued to mount as the city experienced phenomenal economic growth: by 1978, Lagos accounted for 40% of Nigeria's external trade and 40% of the national skilled population. The world recession of 1981 sent Lagos reeling into the debt and runaway inflation which continue today. The ongoing electrical blackouts, housing shortages, sanitation problems and telecommunications logjams all stem from this period. In 1991, Abuja was officially declared the political capital of Nigeria.

Economic data

According to government sources, 62% of Nigeria's GNP is concentrated in Lagos, along with about 40% of currency in circulation and 45% of the industrial labour force. Yet it is estimated that about two-thirds of the city's population live below the poverty line, while 60 to 70% depend on the informal sector. Only about 30% have access to running water. About 6,000 tons of garbage are generated each day and only 0.09% of solid waste is treated. ■

► the country's 250 local languages, has a double meaning: "Lagos is a melting pot" or "Anything goes in Lagos." The bonds of the extended family still weave this city together. Spare rooms, for example, are virtually non-existent as there is always a brother or a cousin needing a place to stay. Church groups also play a key role in celebrations and tragedies, providing a safety net of support for their members. At the same time, Lagos is like any other major city, where personal contacts are the key to finding a decent apartment or a new job. Yet in this city, connections are also essential for finding basic services like electricity, security and water. For example, power outages lasting eight hours are a routine part of the day. Only the rich can afford a generator, but the crafty will work together to lay cables and pirate electricity from a government building nearby.



NB. Classification of neighbourhoods into the 4 categories above is based on the number of occupants per dwelling, residential density, rent levels and income.

Source: Marc-Antoine de Montclos, Development Research Institute, France.

Tapping into water pipes

Break-ins are a major concern for rich and poor communities alike. So each household in the neighbourhood will chip in about $25 a month to hire local patrols which go so far as to close local roads late at night.

"Do not vandalize!" reads a public announcement painted on a water main lining a highway. "Stop the thieves who deprive you of water." But in a city where only an estimated 30 per cent of families have running water, tapping into a pipe is not a crime but a chance for home improvement.

While complacency doesn't gain much ground in Lagos, the driving initiative has yet to spark an organized demand or movement for socio-economic rights. While the reasons behind this are complex, there is one obvious factor: over 30 years of military control and human rights abuse with the

Fear and loathing in Ikosi

An attempt to destroy a fruit market highlights the mutual suspicion between government and people who have no choice but to take matters into their own hands

A corpse lies among rotting vegetables in the street of Ikosi, the largest fruit and vegetable market in Lagos. The killing took place the day before, on April 15, when bulldozers were sent in by the local government to level the market. Barefoot, wearing shorts and a T-shirt emblazoned with the name of American basketball player Michael Jordan, the dead man remains anonymous, probably just another migrant worker at the market where 12,000 people scratched a living. Black cloth covers his face—the sole act of kindness his co-workers can bestow. Only the local government can remove a cadaver but officials don't dare enter Ikosi.

Normally, the market would buzz with lorries dropping pineapples, plantain and yams beside the labyrinth of ramshackle shops, stalls and tables. Now a putrid mix of rotting fruit, tear gas and tension hangs in the air a day after the local government chairman, Mrs. Thorpe, ordered a private contractor to demolish Ikosi, which she considered a fire-trap and a magnet for crime. She maintains that she had the full support of Ikosi's trade union representatives.

Sevi Taiwo is one of those leaders. "We built this place by ourselves," says Mrs Taiwo, who has worked at Ikosi for 30 years. Mrs. Taiwo claims that she met with the local government several times to discuss ways of improving the market's sanitary conditions. She feared that plans to raze and rebuild Ikosi would result in rental fees beyond the reach of the current occupants. Her voice went unheard.

On the morning of April 15, police ordered people to leave as the bulldozer headed for the first shop. The owner pleaded with them to stop but the police kicked and shot his 24-year-old assistant, Bob. As the bulldozer moved on, crowds threw stones and police fired tear gas and bullets. But the marketers kept coming and the police fled. Emboldened by the retreat, the crowd set fire to the bulldozer.

Within an hour, the police returned with reinforcements. "People weren't even fighting, just running as the police fired at them," says Mutia Akintae, a student passing by. "As I ran, I felt my clothes burning." Acid had been thrown on his chest and face, giving rise to speculation that

likes of the infamous General Abacha, who died last year. How do you demand the right to water from a regime which openly rejects the rule of law?

A new elected government is now taking the reins and offers some sense of optimism. But "elections are just the tip of the iceberg," says Prof. Akin Mabogunje, Nigeria's most famous geographer. "To bring some sanity to a city like Lagos, you've got to bring government down to the people by getting them involved in decisions concerning their own neighbourhoods," he says. "This is the only way they can be expected to not just contribute to public works but monitor the ways in which people's representatives spend their money."

Concrete bunkers for the lucky

M.O. Ajayi, an urban planner, says that instead of receiving government help in response to grassroots problems, Lagos has been subject to orders, issued from the top down and often causing more harm than good (see article below). The district of Maroko, which was razed in 1990, is the most obvious case in point. About 300,000 people used to live in this beach-front slum. Sitting below sea-level, Maroko was regularly flooded, with tides of water, mud and raw waste making it an unhealthy place to live and an eyesore for the neighbouring community of Victoria Island, a fortress for the rich.

"The police just came with bulldozers and told us to leave," says Helen Omame, 50, remembering the day 9 years ago when her home was destroyed. "People were killed in the demolition, children left stranded." Today, she and her husband live with their 8 children a few kilometres down the coast at "new Maroko", almost a carbon copy of the original, where the lucky live in concrete bunkers built by the state. Like many other families, the Omame family were never compensated for their losses. At night, the family splits up to sleep in the wooden shacks of the market. "The kids are really feeding the family," says Helen. "It's easier for them to find odd jobs, like collecting garbage and carrying sacks of sand at construction sites."

Ironically, this may be the up and coming area of Lagos. "Everyone is moving out here fast," says a smiling Ellen Kole inside her new ice-cream shop. While luxury homes with domed roofs and sweeping balconies sprout on the horizon, more modest families like hers flock to three-roomed bungalows, lacking water, electricity and a drain for raw waste. "The new government is going to invest here," Ellen announces. In the meanwhile, her family and neighbours will make do on their own as they push the city's limits. Lagos moves on, without a straight course or a plan, but with a singular will. ■

The city is not an asphalt jungle. It is a human zoo.

Desmond Morris, British zoologist (1928-)

© Ray Onwuemegbulem, Lagos

The Ikosi market, still bustling with life several days after the bulldozers went in.

"area boys", bands of unemployed men, had been brought in to intensify the havoc.

In the immediate aftermath, the marketers estimate that up to several dozens of people were killed and a quarter of the shops destroyed. The trade union officials are in hiding, widely suspected of colluding with the government. Women clear the debris, while men patrol for looters. Meanwhile, the elders seek the support of the *oba*, the area's traditional king.

The 97-year-old *oba* is indisposed. Besides, says his secretary, Prince Jede Rokosu, the king's authority extends only over spiritual matters. "I have heard of people being killed at Ikosi," says Rokosu, "but I have not seen anything." Would the prince or the king come to see Ikosi and to consult the elders? "That would not be appropriate." If the people came to the king, could he present their concerns to the government? "Events have overtaken that possibility," says the prince.

Two mornings after the confrontation, a human rights activist is brought to Ikosi for consultation. Under an overhang, women sweep the ground and arrange benches as a crowd gathers. A prayer for peace is offered by Chief Bamiro, an unofficial leader, before discussions turn to Nwaogbe's offer to file a court injunction.

Gradually, a new dynamic takes hold in Ikosi. When the bulldozers first arrived, the marketers were prepared to die rather than see their livelihoods destroyed. But in the aftermath, there is a clear consensus that bravery alone won't prevent another attack. The next step in survival requires organization. So after consulting their people, the elders decide to propose to the government that if the authorities provide specific guidelines for a new Ikosi, the people will build it on their own.

Despite the new resolve, tension is still high with fears of another police attack. Tires smoulder at the front of the market but deeper inside bunches of plantain and bags of millet are on display as children hawk water and music blares from a barber shop. The dead man still lies in the street but Ikosi takes a deep breath. **A. O.** ■

Jakarta's dispossessed

Andreas Harsono
Journalist in Jakarta (Indonesia)

Victimized by speculative development projects and arbitrary planning procedures, millions of Jakartans have had to start their lives afresh

© Ron Giling/ Lineair, Arnhem

A slum in central Jakarta.

On a humid tropical evening in mid-April, Henry Muhamad Ali stood under a tall billboard in southern Jakarta. "Look!" he said bitterly, pointing up to the sign above his head. "It says everybody should apply for a building permit when constructing their houses."

Ali had good reason to be bitter. The billboard had been set up at an intersection near the campus of the University of Indonesia, on a grassy spot where, exactly a decade ago, he had been living in a house legally built on a 2,000-square-metre plot of land. Then came the day when he and his family were forcibly evicted.

"Hundreds of police and army officers, some armed with machine guns, forced my wife and children to leave our home," he cried, adding that tractors had been used to flatten his house.

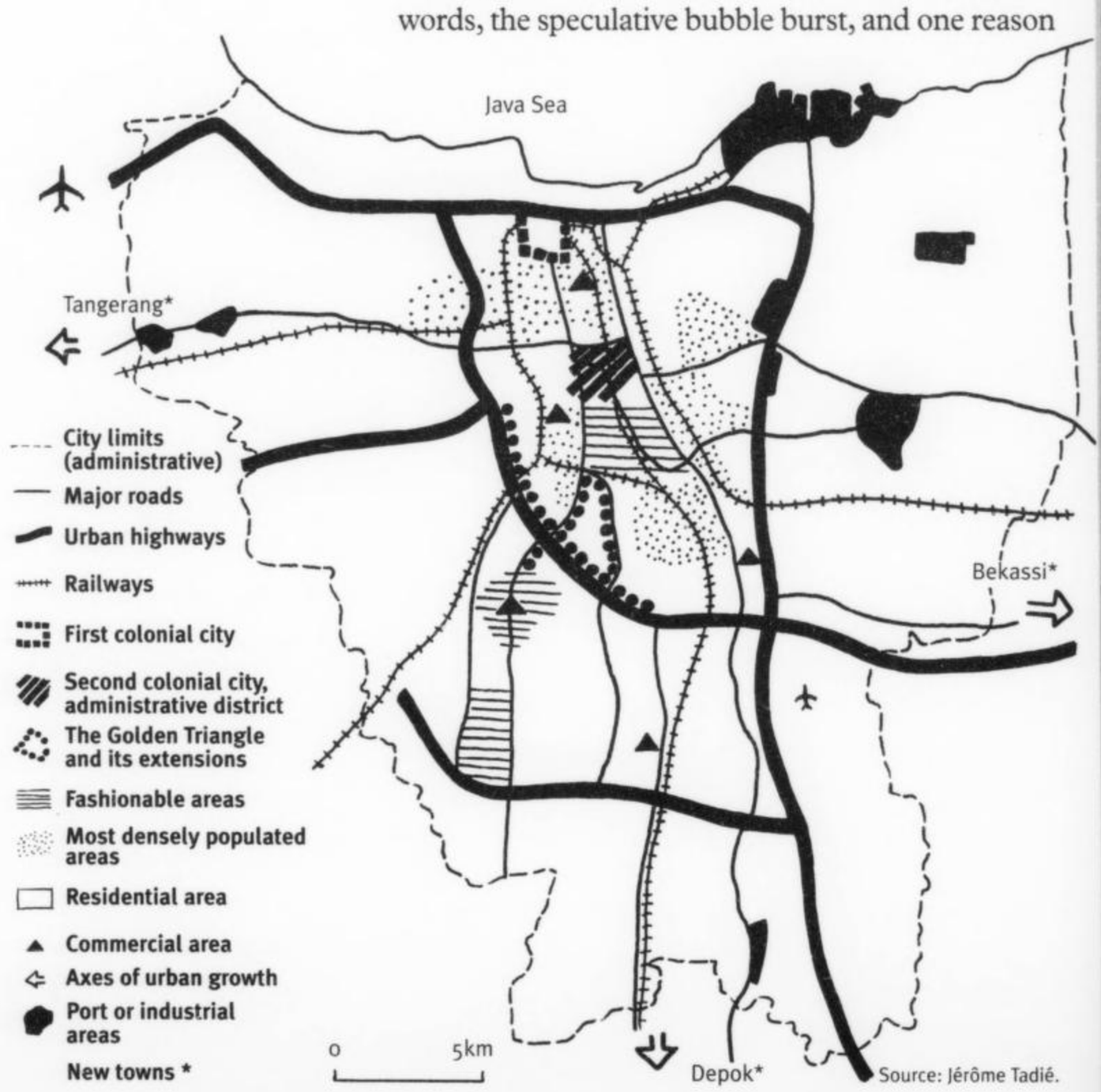
All over the Jakarta agglomeration, many middle- and lower-class Jakartans could tell similar stories. They were the legal owners of houses whose construction had been authorized. Then they were driven out to make room for the skyscrapers, real estate complexes and highrise condominiums that have transformed central Jakarta.

Land speculation in Jakarta—and in Indonesia in general—has been more intensive than elsewhere in Asia. There are several reasons for this. One is that Indonesia has no progressive tax system to discourage people from accumulating land holdings. (A progressive tax system is one in which wealthy people pay relatively more tax than the less wealthy.) Secondly, Indonesian people traditionally like to invest their money in land, which is considered a yardstick of their social status as well as a source of wealth. Government officials as well as private developers jostle to accumulate land: the higher an official's rank, the more land he is likely to possess. Thirdly, Indonesian banks traditionally regard land as good collateral for loans, and in the 1980s and 1990s competed with each other to provide credit for land speculation. They did not realize that Indonesia's economic structure was fragile.

Between October 1993, when the government issued a package of deregulation measures which included the liberalization of land ownership, and June 1998, Indonesia's National Land Agency issued "appropriation permits" to scores of developers over a total area of almost 250,000 hectares.

An appropriation permit allows development companies to approach residents in a target area to negotiate and sell their land. In practice, developers often used strong-arm methods to force small land-owners to sell up.

According to an estimate by the Ministry of Public Housing, by 1999 enough land had been "released" by its owners to satisfy Indonesia's demand for new houses for a hundred years. In other words, the speculative bubble burst, and one reason



Source: Jérôme Tadié.

© Chris Stowers/Panos Pictures, Londres

High-rise blocks in central Jakarta.

why the Indonesian banking sector is enmeshed in economic crisis today is because of its non-performing property loans.

In this "land rush" the government ignored town planning blueprints it had helped to prepare. Hence the story of people like Ali.

At the height of the forced evacuations, in the late 1970s and in the 1980s, Indonesian newspapers were full of stories about developers using armed thugs to harass small land-owners and soldiers strong-arming citizens opposed to what was going on. Human rights lawyers tried desperately to negotiate but in some cases they too were prosecuted and even jailed.

Not all threatened home-owners took things lying down. Some organized resistance, and in one case soldiers on an eviction mission were attacked with sharpened bamboo spears. "Many of these people were actually killed," says Panangian Simanungkalit of the Center for Indonesia Property Studies, who estimates that 4.5 million people were evacuated from their homes in Jakarta during the authoritarian rule of President Suharto between 1968 and 1998.

When officials override planning blueprints

For 55-year-old Ali this was not the first time he had been evicted from his home. In 1959, when Indonesia was preparing to host the Asian Games, his house was one of hundreds in the Senayan district of central Jakarta that were bulldozed to make room for the Senayan Sports Complex, the largest in southeast Asia.

On that occasion he received a small amount of compensation, and used it to buy a plot of land about two kilometres away. Then, in 1979, he decided to sell up for a profit and buy the 2,000-square-metre plot of land in Srengseng Sawah where he would later experience eviction for a second time.

Before he made the purchase, however, he took certain precautions. He went along to the office of the Governor of Jakarta and to the mayoralty of southern Jakarta (see box) and consulted the Master Plan the authorities had drawn up to deal with problems of Jakarta's rapid urban growth. He was reassured when officials told him that the Srengseng Sawah area was intended to be a housing zone. Later he was issued with a building permit. Then, in 1989, officials simply said that they had changed the Master Plan. When Ali protested the Jakarta authorities ordered the soldiers to go in.

What happens to Ali and the millions like him who have been expelled? Where do they go and how do they set about rebuilding their lives?

A lot depends on their means. The authorities provide compensation for evicted people, but this is usually very low. On average it amounts to one-twentieth of the market price of their property according to Panangian.

The government tried to introduce low-cost housing in certain areas, but its efforts were a drop in the ocean and were soon dwarfed beneath the forest of high-rise condos and skyscrapers.

Officials usually encourage displaced small landowners to move to the suburbs or to join a government-sponsored transmigration programme designed to relocate people from overpopulated islands such as Java, Madura and Bali to more sparsely settled islands such as Irian Jaya, Kalimantan or Sumatra.

Those who can afford to do so move out to the ▶

Factfile

Population

The UN estimated that the population of the Jakarta urban agglomeration, Indonesia's capital and largest city, was 8.6 million in 1995, having risen from 1.452 million in 1950. According to UN projections, it will be almost 14 million in 2015. Jakartans are drawn from many ethnic groups. Sundanese from West Java and Javanese dominate, but Sumatran, Minangkabau, Balinese and others are well represented. There is also a significant Chinese population which was victimized during massive rioting in May 1998. Most Jakartans are Muslims, but Buddhism, Hinduism, and a variety of Christian confessions are also represented.

Political situation

In 1966 the government declared Jakarta (total area 661 sq km) a special metropolitan district with a status and administration similar to that of a province. The city has a governor and five mayoralties: Central Jakarta, South Jakarta, North Jakarta, West Jakarta and East Jakarta. Central and West are the main business areas. Most government offices and embassies are located in Central. A mayoralty comprises several districts (*kecamatan*), and a district consists of between a dozen and two dozen sub-districts (*kelurahan*). Mayors are appointed by the governor.

Economic data

Jakarta developed as a centre of trade under the Europeans and still plays an important role in international and domestic commerce. Jakarta's share of gross domestic product represents 9% of the national total: 14% of transportation and communication, 15% of manufacturing, 25% of trade and services and 65% of banking. Manufactured goods include textiles, footwear, clothing, foodstuffs, chemicals, plastics and electronic devices. But manufacturing is much less important than in other Asian cities at comparable levels of development.

History

In the late 16th century the Dutch East India Company built a walled city, Batavia, as a trading centre. The Dutch built drainage canals and later an extensive urban railway system. By 1930 Jakarta had 530,000 inhabitants, and included a Chinatown and a modern European quarter surrounded by rural villages (*kampungs*). In 1945 Indonesian freedom fighters declared Indonesia's independence and renamed the city Jakarta. ■

suburbs. Many have settled in Bekasi, to the east, and Tangerang to the west, which have become the main concentrations for the growth of manufacturing employment and population on the outer edge of the Jakarta agglomeration. For the poor it was, and is, a very different story (see below).

Compared to many, Ali was lucky. When he was evicted, he filed a lawsuit against the authorities. At first he got free legal aid, but did not work while waiting for his case to come up and spent a lot of time attending court sessions. After a protracted legal battle his case was dismissed on appeal in 1996, but he was awarded compensation of around 50 million rupiah ($19,230 at the then exchange rate). This was just enough to buy the 150 square-metre plot of land where he and his family live today, a kilometre away from the site from which they were expelled in 1989.

When he lost his house, Ali also lost his workplace—he used to be a welder. Like other displaced households, the family has become much poorer. If Ali had been allowed to keep the house he owned in Senayan in the 1960s and 1970s he would now be a very rich man indeed since land prices in this desirable area of Jakarta have skyrocketed.

Ali is now out of work. His wife, Umroh Aini, tries to support the family and has opened a small kiosk at a bus stop, selling soft drinks and peanuts. Their children, aged between nine and 30, share the small house with their parents. The three oldest sons dropped out of school and found work as bus drivers.

Displaced people like Ali lose their confidence as well as their homes. They feel they have failed in life. They also leave behind them the tightly knit social support network of neighbours and relatives which is a strong feature of Indonesian life. People who live in Jakarta's new suburban areas usually come from a patchwork of ethnic and religious backgrounds. Many people do not know their neighbours.

Those who live in the suburb areas face many problems, ranging from longer commuting hours to bad sanitation, inadequate telephone lines and low water quality.

Clean water for 5% of the population

Water supply is an ever-present problem in cities of the South and Jakarta is no exception. PAM Jaya, the water supply operator, is perhaps Jakarta's worst-run state-owned company. In spite of 170 per cent growth between 1987 and 1997, it can only supply clean water to around 5 per cent of the population. Displaced families have to rely on their well. The water from Ali's well is still drinkable, but many other families, especially in central and northern Jakarta, have to buy their drinking water every day from itinerant vendors.

PT Telkom, Indonesia's telecoms utility, has turned in a better performance. Between 1992 and 1997 it increased the number of telephone lines in Jakarta from 560,000 to 1.7 million, a 200 per cent increase. But supply is still far below the demand of Jakarta's nearly 10 million people.

The trouble is, Ali couldn't possibly afford to be hooked up. When asked his telephone number, he smiled and shook his head, "These shoes I am wearing are the only ones that I saved from the wreckage in 1989," he said. "If I can't afford to buy new shoes, how can you expect me to have a telephone?"

Later on that April evening, when Ali was about to leave to meet his wife, he described how he had joined thousands of students occupying Indonesia's parliament building in May 1998. He shared their objective: to kick out Suharto.

"Suharto's daughter built this intersection," Ali said as he left the site where his home and his dream were taken away from him a decade ago. One thing he didn't lose on that fateful day was his pride. ■

The idea of a global village is absurd; it's in cities that tribes have been reborn.

Stephen Frears, British film director (1941-)

Dismembered communities

Ali may have been unlucky, but things turned out much better for him than for millions of other Jakartans.

Nearly half the population of the Indonesian capital now lives below the poverty line, which means a monthly income of less than $20 per family. Property speculation has particularly affected the slums where most of the poor live.

Ms Wardah Hafidz, who runs a Jakarta-based NGO, the Urban Poor Consortium, cites as a routine example the case of the people of Kampung Sawah, in western Jakarta. In 1994, a government office claimed the land. Initially the residents refused to leave, but finally had to give in after accepting a pittance in compensation—between $30 and $70—despite having lived there for more than 20 years. When President Suharto fell in 1998, they filed a lawsuit against the government.

Payment of compensation, however small, is by no means a universal practice. Evicted people are not in a strong position. The agents of the promoters first utter a mixture of threats and promises to each family. If the victims decide to resist, they usually meet and choose leaders to represent them.

This is taking a great risk, says Hafidz, because they are then marked out for a campaign of terror by the henchmen of the promoters, or by the military. The evicted people are also more vulnerable because they are usually squatters.

Some of them use their meagre compensation to resettle in a distant suburb, but most spend the money at once and have to look for another illegal roof in one of the slums that line the railway tracks and the river banks. "Hardly anyone becomes richer as a result of being evicted," says Ms Hafidz. Property speculation is one of the main causes of impoverishment.

Such evictions also tear apart the social fabric. Jakarta gradually grew up as *kampungs* ("villages") developed around the old colonial centre. The social ties there were very strong because most people came from the same rural area. They even won some political and administrative recognition, and each *kampung* would choose a "chief" who represented them before the authorities.

The evictions are destroying this community spirit because people are being scattered all over the city and its surrounding area. Hafidz says the the problem of violence in Jakarta, including increased conflict between neighbours, has worsened with the recent economic crisis. But the violence is also caused, she says, by weakened solidarity as a result of the destruction of traditional social ties. ■

A Brasilian's home is a castle

Licia Valladares and Martine Jacot

Licia Valladares is a sociologist at the University Research Institute in Rio de Janeiro (IUPERJ) and visiting professor at the French Institute of Town Planning (IUP, Paris XII) Martine Jacot is a *UNESCO Courier* journalist

In the suburbs of the Brazilian capital, even poor families barricade themselves behind iron railings. To guard against thieves, but also to proclaim that they have conquered a fiefdom in the city

Brasilia is two places. One of them is Brazil's futuristic capital, built between 1957 and 1960. This monumental city, dreamed up by town planner Lucio Costa and architect Oscar Niemeyer and known as the central zone *(plano piloto*; see drawing, page 31), has about 300,000 inhabitants (as originally intended), mainly the staff of government ministries and foreign embassies.

Much less known to the world is the other Brasilia, the suburbs where middle-class and poor Brazilians live. In the original plan, these areas were not supposed to have more residents than the central zone. But today there are 16 satellite cities, forming a huge urban expanse containing 1.3 million people. And one thing always strikes visitors to this metropolitan jigsaw puzzle: the number of dwellings—whether elegant villas, humble wooden shacks or residential complexes—that are surrounded by metal railings.

© Evandro Matheus

"Smile, you're on camera," reads a sign at the entrance to a bakery in Ceilandia. The warning continues on the right: "Dear customers: we apologize for the inconvenience of these security measures. Please wait. The doors open automatically."

In front of smart houses in Núcleo Bandeirante, the oldest satellite city 15 km south of the central zone, and in the nearby towns of Taguatinga, Guara and Cruzeiro, iron railings often rise from the pavement as high as the first floor, giving the impression that people are living in cages.

In the poorest and newest suburbs, like Santa Maria (which sprang up in 1994), Recanto das Emas and Samambaia, many people even put up iron railings round their wooden shacks before they've been completed. The same goes for new migrants, who continue to settle, though at a slower rate than before (see factfile), on the "edge of the edge" of the city, in country areas and even in the neighbouring state of Goias.

The first explanation you hear for these railings is the frequency of crime. "Until eight or nine years ago, the satellite cities were safe places," says Jesse de Souza, a 35-year-old army officer. "But since then, crime has shot up. Burglars don't bother any more with the *mansoes,* the wealthy villas by the lake in the central zone, because they're too far away and the security there is too sophisticated. The buildings in the central zone are guarded round the clock.

"But in the satellite cities, it's much easier for thieves. Everything gets stolen—bicycles, cars, car radios, CD players, television sets from inside houses. They tried to break into our house. It was the railings that saved us." De Souza was born in Bahia state and lives in Ceilandia, a satellite city of 360,000 people founded in the 1970s to rehouse migrants from the slums.

The private surveillance business

Maria de Jesus Pereira, a 40-year-old housewife, insisted that her husband put up iron bars before they could be burgled. Many people are unemployed in Santa Maria and theft is common. "And now my four children can play safely," she says, "I can even leave them outside the house, behind the railings, while I run a few errands."

Since the early 1980s, violence and security have been a major issue in Brasilia and even more so in other big Brazilian cities and elsewhere in Latin America. A whole industry has grown up around the demand for private security and sales of security equipment—from intercoms to camera surveillance systems—are booming.

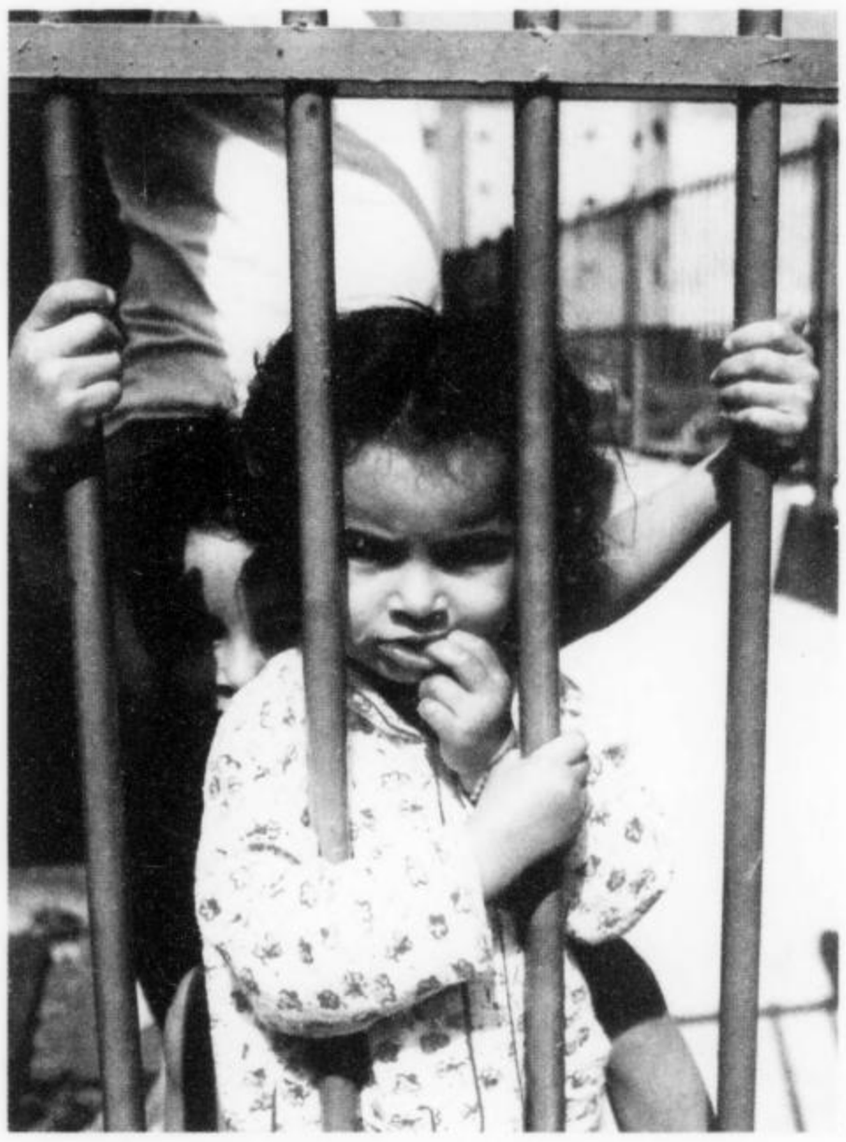
The most extreme examples of this trend are the *condominios fechados*, private estates (houses, apartment blocks, shops and services) hidden behind walls and which you can only get into by showing an ID to watchmen at a guardpost. Promoters have successfully sold the idea of "peace and security" to house-buyers. In the centre of cities and in the suburbs, such closed communities and other protected areas are multiplying. They are, as Teresa Caldeira describes it[1], fortified enclaves for the upper and middle classes. Their existence helps to increase urban segregation, with poorer people relegated to areas which are still public but poorly equipped with infrastructures or even derelict. ▶

1. See her article "Building up walls: the new pattern of spatial segregation in São Paulo" in *UNESCO's International Social Science Journal,* No. 147, March 1996.

In Brasilia, the central zone is itself a kind of fortress, whose walls are invisible. The only border between the capital and the satellite cities, which are situated at a safe distance, is a belt of green countryside. The guarded communities have grown up on the edge of this green belt. But surprising though it may seem, the satellite cities beyond bristle with iron railings.

Town planner Marilia Steinberg, of the University of Brasilia, thinks the constant concern about security masks more subtle reasons for these measures. "Migrating to Brasilia was for all of us a gamble, an adventure," she says. "I don't know anyone who's stayed in the new capital or nearby who hasn't now got a better life. The railings protect you but they also let you show off how quickly you've gone up in the world, materially and socially." A wall hides everything but you can look through railings and see the house and even what is going on inside it. You can also see the car or cars—a sign of success—parked in the yard.

Other observers agree that such reassuring, effective and probably even essential defences also play a symbolic role. The inhabitants of this other Brasilia came to the capital to begin a life or make a new start, dreaming of success. Yet such dreams have almost been outlawed. The building of the central zone, from 1957 to 1960, called for the hiring of more than 100,000 labourers *(candangos)*, mostly from northeastern Brazil. These workers lived in wooden shacks on the edge of the central zone. After Brasilia was officially opened on April 21, 1960, their makeshift houses were dubbed "illegal slums". But most of the workers, proud of their pioneering efforts to build a new capital, refused to leave the new El Dorado. Other migrants eventually arrived from all over the country and settled on vacant land outside the central zone.



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Playing safe behind bars in Cruzeiro.

Faced with the influx, the federal district authorities decided in 1970 to improve conditions rather than trying to evict everyone. They built up the infrastructure of the satellite cities so as to head off any haphazard "invasion" of the central zone.

The prevailing impression is that each migrant family somehow wants to show by means of railings that it has carved out a fiefdom, however small, and that its dream has come true here in the federal district, at the gates of what is known as "official Brazil".

The story of Cleiton Pereira Santos, a 23-year-old geographer, illustrates this social ascension and

Today, some people criticize Brasilia as cold, impersonal, inhuman, empty. It is not our fault [that of Lúcio Costa and Oscar Niemeyer] if Brasilia has fallen victim to the injustices of capitalist society.

Oscar Niemeyer, Brazilian architect (1907-)

Uninviting: high railings rise up around a private housing estate at Sobradinho, one of Brasilia's satellite-cities.

© Evandro Matheus

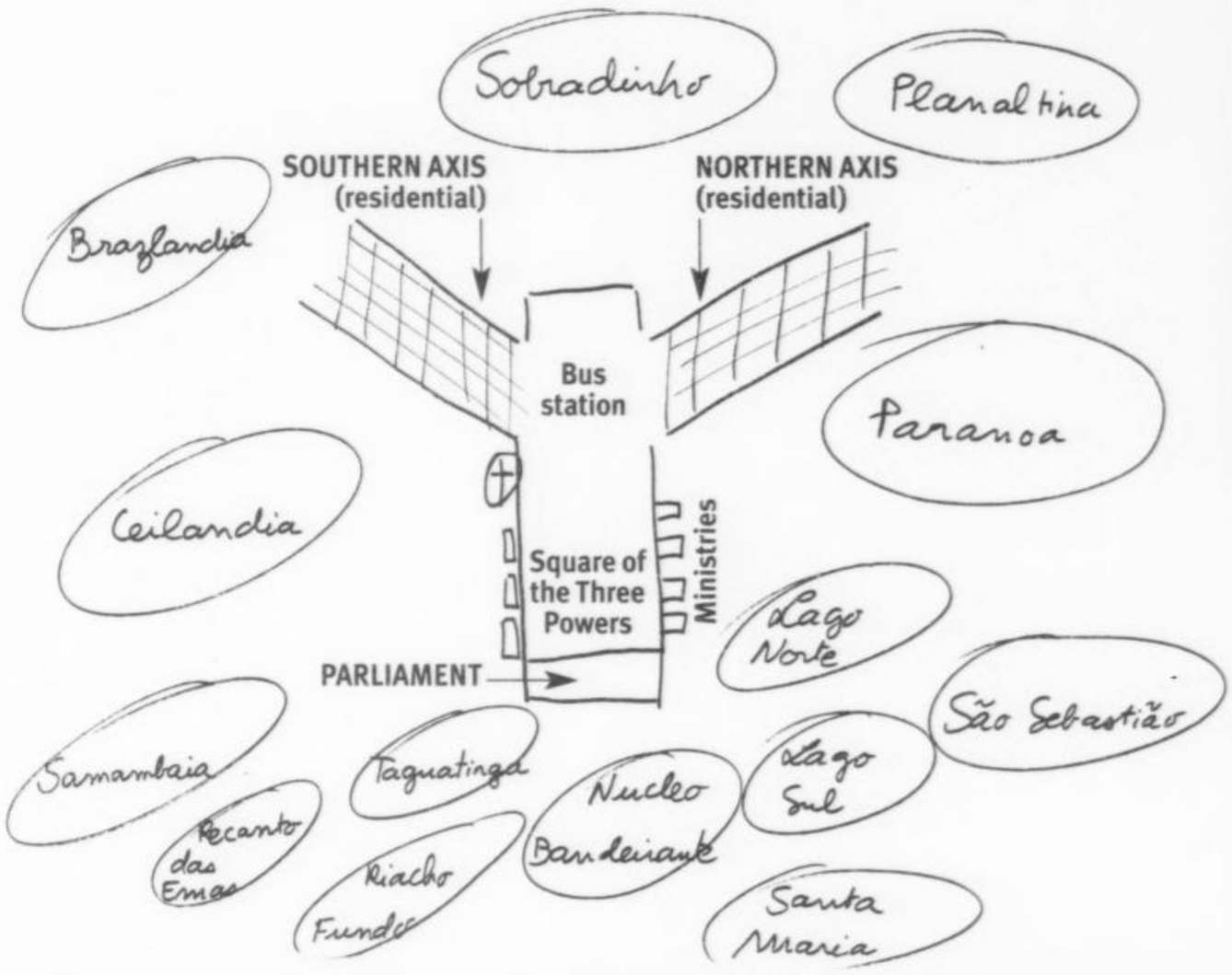
values very well. "My father, who was from a small town in the northeastern state of Piaui, came to Brasilia to work as a mason in the early 1960s," he says. "At first he stayed with a relative, and then went back to fetch my mother. The two of them rented a small apartment in the central zone. But they wanted their 'own' home, so they built their first house, which was quite modest, in Taguatinga. Later they sold it and built a detached house with railings in Ceilandia. My father, who has built up a small business, now wants to sell that, buy some more land and build a guarded house on it."

Status symbols

Brazilians of all classes want to own their own homes. Official figures show 72 per cent of all houses are privately owned, and government bodies like the National Housing Bank have always encouraged home ownership rather than paying rent, even in the area of public housing.

But in Brasilia and in the rest of the country, buying your own house is also a way to protect yourself against another kind of insecurity—economic uncertainty. Continual crises have driven home a blunt message: that you can easily lose your job but it's much harder to lose your house if you own it in a country where a government social safety-net hardly exists. All the more reason, then, to see that your house is secure and that it keeps its value. A house is worth more with iron bars around it than without. All houses in the "other Brasilia" fetch a good price, even wooden shacks.

The railings are part of this world of symbols and values. They are also to some extent a counterpoint to Costa and Niemeyer's central zone, with its avant-garde concrete buildings and monuments. The inhabitants of the other Brasilia only go into the capital, the city of the ruling class, to work there or to catch a bus home. The railings are perhaps the response of the poor to the social and geographical segregation imposed on them by a fortress-capital, a symbol of success outside a citadel without walls. ■



Town planner Lucio Costa's 1957 blueprint for Brasilia, known as the central zone *(plano piloto)* was based on what he called "two axes which intersect at right angles to make a cross" or what looks more like a large bird. Along the main axis are the city's chief centres of activity—with at one end the huge Square of the Three Powers (executive, legislative and judiciary) and the Ministries' Esplanade. On each side of the arms of the cross (or wings of the bird) are residential areas divided into *superquadras* (groups of housing blocks). The idea was to build a city without road junctions, where "the car is no longer the implacable enemy of people". Inside the central road intersection complex is a huge bus station called Plataforma, which more than 400,000 people pass through every day, coming in from the satellite cities. Brazilia is on UNESCO's World Heritage List.

Factfile

The federal district of Brasilia covers 5,788 sq km and includes the central zone of Brasilia itself, 16 "satellite towns" and a rural area.

Population (official census figures)

The number of people living in the federal district rose from 546,000 in 1970 to 1,176,800 in 1980 and 1,822,000 in 1996. The population growth rate is slowing down, as in Brazil's other major cities. In Brasilia, it fell from 8.1% between 1970 and 1980 to 2.84% between 1980 and 1991. Internal migration in Brazil over the past 10 years has been mainly to the states of Mato Grosso and Rondonia, which has relieved pressure on cities like São Paulo and Rio de Janeiro.

Political situation

After the 1964 military coup, Brazil had 21 years of army rule. Civilian government returned with elections in 1985.

According to the terms of the new national constitution of 1988, the federal district is run by a popularly-elected governor (he had been appointed by the central government since 1960) and his deputy. Joaquim Roriz became the first elected governor in 1990. Defeated in a re-election bid in 1994, he was succeeded by Cristovam Buarque, but returned to office in 1998. The governor, deputy governor and the administrators of all the federal district's constituencies make up the district's executive body. Legislative power is in the hands of 24 deputies elected every four years at the same time as the governor.

Economic data

Twenty-two per cent of the federal district's workforce are civil servants, 14% work in business and 53% in other service activities. Economic life is dominated by small businesses or very small operations set up by the inhabitants of the satellite towns. Unemployment is put at 22% of the workforce, however, according to an official body, CODEPAN (central plateau development commission).

Official figures show that a third of all those living in the federal district own a car and 92% have television. Basic utilities are available to nearly everyone—93% have access to drinking water and 84% are connected to a sewage system. ■

The iron railings of Brasilia have not yet been written about by specialists, but the following works describe their context:

- ***The Modernist City: Architecture, Politics and Society in Brasilia*, James Holston (Yale University 1986).**
- ***Brasília: a construção do cotidiano*, by Brasilmar F. Nunes (Editora Paralelo 15, Brasilia, 1997).**
- ***Brasília, Ideologia e Realidade: espaço urbano em questão d'Aldo Paviani* (Editora Projeto/CNPQ, São Paulo, 1985).**
- ***Brasília: moradia e exclusão*, by Aldo Paviani (Editora UNB, Brasilia, 1996).**

Shanghai's migrant millions

James Irwin
Shanghai-based Canadian journalist

As it learns to manage the massive influx of 'temporary residents' that provide muscle for its explosive economic growth, China's city of opportunity is treading a delicate balance between control and grassroots involvement

Among the well-dressed university students mingling just outside the gates of Shanghai's prestigious Fudan University, three men stand out. Dressed in surplus army uniforms, they perch on the curb behind small cardboard signs stuck in pavement cracks. The crude signs advertising their labour for odd jobs or construction work can be hastily snatched up and hidden should the police make a sudden appearance.

The men, migrants in their 20s and 30s from the nearby city of Suzhou, never know when they might have to make a quick get-away. Unemployed for the past month and flat broke, they haven't paid the temporary residence permit fee, which makes them subject to possible eviction from Shanghai.

"We don't have much money for anything, including the 15 RMB[1] (US$1.75) for the monthly permits, so it's better if we stay clear of the police," says the eldest of the three.

A steady stream of manpower

Temporary residents, the so-called "floating" population, are everywhere in China's richest city. On bicycle and afoot they stream through the city, ringing bells and shouting out offers to sharpen knives, sell fruit and vegetables from their carts or haul away old junk and garbage. Like the three men from Suzhou, they are ready to do almost anything, provided it will keep them in China's city of opportunity.

Such is the allure of Shanghai that an estimated 3.3 million of its 13.6 million population are migrants. Thanks to a thriving economy propelled not only by economic reform but also an ambitious national policy to transform Shanghai into a major Asian financial centre, the city has turned into a huge construction site. Migrants have filled the need for sheer manpower. But for the most populous city in the world's most populous country, the massive migrant population brings new problems, from huge strains on infrastructure to an exacerbation of a widening social chasm between the haves and the have-nots.

China is going through "urbanization of a scale never seen before in its history," says Wu Weiping, a native of Shanghai who teaches Urban Studies and Planning at the Virginia Commonwealth University in the United States. Already some 30 per cent of the country's 1.3 billion people live in the cities. That proportion is likely to reach 50 per cent in the not-too-distant future, according to Wu.

In a word, the challenge is of truly epic proportions. But so far Shanghai does at least seem to be averting many of the worst problems of urban swell common in other developing countries. Then again, not every city in the world has at its disposal the tool that has been a key to Shanghai's qualified success: a set of controls perhaps only possible under a system of authoritarian government.

"China is one of the few places where there is a deliberate government policy that addresses urbanization," says Wu. One solution has been to encourage the growth of small and medium-sized cities around the country to take some of the demographic pressure off the largest city. The other pillar of the urbanization policy is to control migrant populations once they have reached a city. It is in this latter area that Shanghai has shown its skill.

Migrants started making their mark on cities soon after they were first allowed to move there in 1978, the beginning of China's economic reform programme. Control on mobility was effected through the *hukou,* or place-of-origin system. One had to remain in one's place of origin unless granted permission to move. Apart from being illegal, migration without official approval made life quite literally unlivable: without the appropriate *hukou* card one was denied access to essentials such as ration tickets for rice, meat and cotton cloth.

'China is one of the few places where there is a deliberate government policy that addresses urbanization'

But the former constraints on migration were arbitrary, imposed from the top down, and were certainly not compatible with the market economy that was to develop after the Cultural Revolution. As the economy exploded, jobs opened up for unskilled labourers, particularly in coastal areas where most of the foreign and domestic investment has poured in. In response, the authorities have encouraged migration to bring in cheap labour. Meanwhile, higher crop yields and rising population on a dwindling arable land mass have left the countryside with at least 100 million surplus labourers.

1. The Chinese currency is called Renminbi (RMB).

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Building up the modern city: migrants are ready to take on all kinds of heavy work in order to stay in Shanghai.

The *hukou* card system is still in place, but cities like Shanghai today also issue temporary permits to accommodate migrants. The temporary permit system gives the government the best of both worlds: flexibility and a relatively strong level of control.

Migrants must first get permission from their local government back home to work away from their area of origin. Upon arrival, the fortunate stay with family or friends from back home, while others sleep rough as the authorities provide no accommodation for transients.

Should they want to stay more than three days, migrants are required to get a three-month residence registration, which can then be extended for a two-year permit issued by an enterprise or local police station. Permits are granted only upon proof of legal accommodation in the city and of employment. On top of this, migrants need to apply for an urban employment permit, renewable yearly for a fee equivalent to $8.40. Unlike blue- or white-collar employees, street vendors and small retailers apply for business licences instead of employment permits. Only after they have managed to make it through all these bureaucratic check points are migrants legally allowed to remain in the city.

The temporary permit system means that in times of economic downturn—such as that which has left the three Suzhou men jobless for about three-quarters of the past year—the authorities have some leverage to force migrants to go back to their homes. An estimated one in four of Shanghai's floating population doesn't bother to register with the authorities.

Ignoring the law seems to be much easier than it was, certainly in the pre-economic reform era. So much of the economy is now private that one is not necessarily forced into contact with the state. At the same time, the success of economic liberalization means that food and other basic goods are so abundant that ration coupons are no longer needed—again, reducing reliance on state organs. Also, the numbers of migrants are so huge that it is impossible for the police and other authorities to keep tabs on them all.

It is possible for migrants to achieve long-term residency, but the hurdles are substantial and ensure that most will never make the grade. For example, to make the leap, migrants must purchase an apartment or house, which requires considerable cash; get corporate sponsorship, which is usually granted only to the well educated; or marry a local, which requires overcoming the considerable prejudice of the snobbish Shanghainese who shower disdain upon the floating population. ▶

City planning has had its day. The age of culture is beginning.

Oriol Bohigas Guardiola, Spanish architect (1925-)

But while the state keeps close watch on migrants, it also intervenes to make sure they have at least the basics of survival. That help is motivated not only by a sense of charity or social duty: the last thing the state wants is for social problems to fester and explode into mass movements potentially challenging the political order.

Life for migrants, while in many ways difficult, is nevertheless not impossible. For example, on the city's northeastern outskirts at the long-abandoned Jiangwan airport, sits a temporary residents' camp sanctioned by the municpal government three years ago. The community is anything but fancy, and life here pales in comparison with that of the middle classes and especially the small, but visible class of new rich who have made it to the top through a mixture of contacts, savvy and privileged position. Nevertheless Jiangwan is relatively clean and orderly—a far cry from squatters' communities found in the worst slums of other developing countries.

The site, home to 500 families, includes a rudimentary health dispensary, a few workshops, tiny factories, small stores, a clutch of hairdressers, ramshackle places to eat, market gardens and a host of other small businesses. Young children proudly lead the way to a schooi which, while rudimentary, does have a television, a stereo and wall maps of the world, and is probably no different from thousands of other elementary schools in poorer parts of the country. The teachers, mainly in their early 20s, come from the same provinces as the migrants and thus share a common dialect. The children themselves seem cheerful and outgoing, and are all properly shod and healthy looking—apparently enjoying the same sort of parental attention that China's one-child family planning policy has inadvertently ensured for today's youth.

People like each other so much that when they escape from the city they still look for crowds, in other words they reconstruct the city in the countryside.

Charles Baudelaire (1821-1867)

The majority of the adults, who come from nearby provinces such as Jiangsu as well as poorer, hinterland provinces including Henan, Anhui, Szechuan, leave the camp to work each day in nearby Shanghai and its environs. To do so they must pass through the gates of the compound under the occasionally watchful eye of the gatekeepers, most of whom are laid off workers from state enterprises and all of whom are bona fide Shanghai residents.

Second-class citizens

Like other such camps, Jiangwan is under the jurisdiction of the local district committee, which is responsible for ensuring the residents are registered, taxes and temporary residency permits are paid, and security is maintained.

Each family pays approximately $70 to the private landlords who built and own the rows of houses where it and its neighbours live. In a country where the state has traditionally provided housing for nominal amounts of money, these rents are very expensive. Likewise, the half-yearly tuition of about $50 is fairly onerous. Yet migrants don't seem to complain much, perhaps because overall life in the city is better or more promising than that back at home.

Apart from the temporary permit system, there are a number of factors which help the municipality manage the floating population issue, not the least of which is the city's policy of grassroots management. In a pyramid-shaped organizational structure with the city at the apex, the district just below, the street next and the neighbourhood forming the wide base, the city has found a way of keeping local involvement high.

Through this last level of government, the neighbourhood committee, the authorities oversee day-to-day contact with the transient population. Once known for being composed of busybodies who interfered at every opportunity in people's lives—denouncing and ensuring punishment of everything from extramarital affairs to even mild forms of political or even social dissent—the committees have been professionalized in recent years. Where once they were usually composed of retired people, now they are manned by paid staff, usually displaced state employees who have been specially trained, notes Wu. Instead of being seen largely as an instrument of interference in people's private lives, the committees nowadays concern themselves with practical, everyday affairs.

Wu believes this approach is miles from central planning-type *diktat*, a remarkably efficient form of maintaining control while answering genuine needs for social service. As the population under any one

Factfile

Population

The Shanghai agglomeration is the most densely-populated part of China. Some 13.6 million people live there, in an area of 6,340 sq km. This includes the city itself (375 sq km), seven industrial satellite cities and some small outlying towns. There were just over five million people in 1950, so the population has more than doubled in less than 50 years. It is expected to top 18 million by 2015, according to the latest UN projections (see *World Urbanization Prospects*, New York, 1998).

Political situation

The self-governing municipality of Shanghai answers directly to the central government. China's current president, Jiang Zemin, as well as his prime minister, Zhu Rongji, were both once mayors of the city. The present mayor, Xu Kuangdi, studied in England and then taught engineering at Shanghai University.

Economic data

Shanghai is China's biggest port. It has a long trading and industrial history and was the port of entry during the Empire, from 1842, when the Treaty of Nanking was signed. More recently, the opening-up of the city launched in the 1970s with the approval of the central government has boosted its development. The main features of this are heavy industry (metallurgical and steel plants, petrochemicals, building ships and planes) and textile, electronic and computer industries. In 1990, the government announced it was setting up a special new economic zone called Pudong which would be China's new financial centre.

The economy of the Shanghai area grew by an annual 14% between 1992 and 1996, while direct foreign investment reached $10 billion a year. In 1997, this investment rate fell by half, pulling the growth rate down to 12.7%. It fell further last year, to about 9%, according to official estimates. Fallout from the Asian financial crisis and recent industrial restructuring has increased unemployment, which is officially 8% but is unofficially estimated to be double that. Annual per capita income remains way ahead of the rest of China however at $3,000, compared with only $860 for the country as a whole.

New sectors have recently been earmarked as priority areas, including telecommunications, new technologies and the pharmaceutical and biotechnology industries. ■

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Shanghai's train station serves as a dormitory for many migrant workers.

ducation by their employers or the government. The same goes for medical services. Not so the temporary residents, who must pay the full cost should medical treatment be necessary. And their children, many of whom are born in Shanghai, are destined to be forever locked on the outside looking in. Migrant children are unlikely to mingle with their Shanghainese peers. A Shanghainese parent would be distraught if his child married a migrant—which is not all that likely anyway as the two worlds are, for all the physical proximity, culturally leagues apart, difference of dialect being just one of the many factors. Besides, there is a big price to pay: when a Shanghainese man marries a migrant woman, their child inherits *her* place of orgin.

Part of the disdain comes from the sheer lack of sophistication of the migrants in terms of dialect and demeanour, and their misplaced expectations. For example, male economic migrants typically buy a suit before hitting the big city in hopes of landing a desk job. They often end up wearing the suits—the labels still stitched to the sleeves—not in fancy office blocks, but on construction sites. Another cause for animosity is that problems such as rising crime are attributed to migrants.

One does not have to look very far for signs of contempt or discrimination. Outside a high school in downtown Shanghai—gleaming with new buildings and proud of its new sports stadiums, expressways and a metro system, all built by migrants—a policeman on a motorcycle is checking the papers of a migrant worker who has been selling brightly coloured shoelaces to the students. Not even deigning to get off his bike, the policeman speaks sharply to the middle-aged woman.

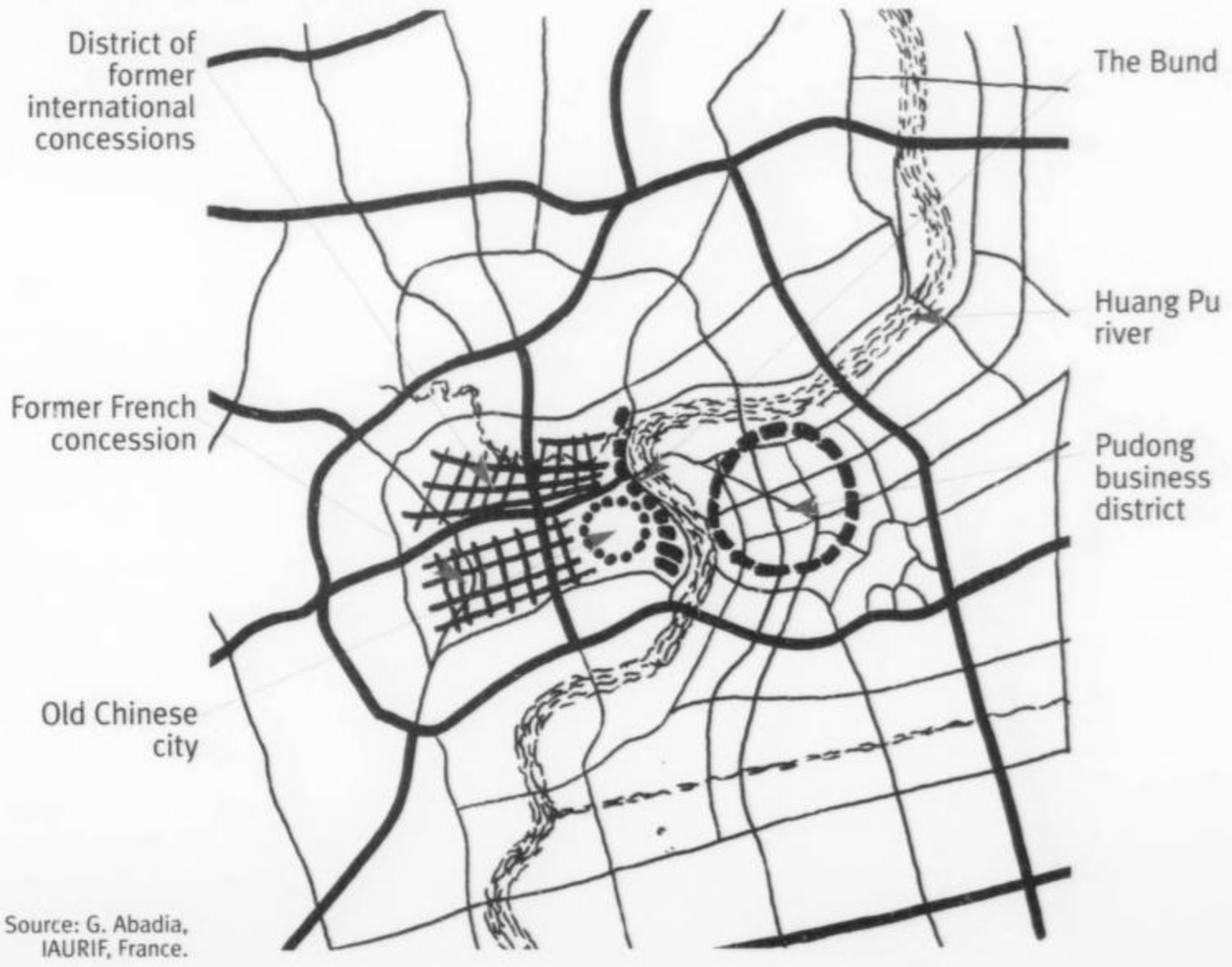
Distraught and crying she pleads her case to the uniformed figure of authority who snaps closed his notepad and speeds off down the street.

Still weeping, the woman gathers her meagre goods and begins walking away, watched by a small crowd of Shanghai residents. Where she'll go is anyone's guess. ■

resident committee rarely exceeds 2,000 people, the organization is characterized by a strong sense of familiarity.

Another tool for managing migrants is urging employers to provide housing for their staff. Wu estimates that 36 per cent of migrants in Shanghai live at or close to their place of work and that nearly half of all rural labour migrants live in housing provided by urban enterprises. Two-thirds of those listing construction as their occupation live at construction sites.

But while migrants may fare better here than in other parts of the developing world, there is little doubt that they in effect do not enjoy the same status as Shanghainese. Migrants are second-class citizens, grudgingly accepted for their labour but mistrusted because of the stresses they add to the city's infrastructure. Other residents of Shanghai are often subsidized for the cost of their children's e-



Source: G. Abadia, IAURIF, France.

Urbanization and globalization

Jorge Wilheim
Architect and town planner in São Paulo, author of plans for a number of towns and cities, including Curitiba, in Brazil. He was also deputy secretary-general of the UN Habitat II conference (Istanbul, 1996).

How we handle globalization will determine whether our cities and our civilization will be divided and violent or user-friendly and peaceful

We cannot get a clear picture of urban life in the 21st century, especially in the poor countries of the South, unless we take into account the phenomenon of globalization, which has already brought dramatic changes. Cities, and especially mega-cities, are where those changes make their first appearance. So it is there too that the great upheavals of the next century will take place.

Globalization gives shape to the "global village" predicted by the Canadian Marshall McLuhan. The "information era" that it ushers in compresses time and we are now living in a world speeded up as never before. World-wide urbanization is proceeding at a similar rate and its pace in the poor countries of the South seems terrifying. By 2025, two-thirds of humanity will be living in cities and towns, where the best opportunities in life tend to be.

Globalization also accentuates a "new urban geography" in both North and South. Islands of rich consumers are springing up in cities amid an ocean of deprived people. More and more unemployed people, immigrants, minorities and the homeless, are pushed into cities by pressure from "market economies". As a result, all urban areas—not just those in the poor countries of the South—will have to deal with growing internal tensions. In New York, for example, the poorest 20 per cent of the population earns 15 times less than the richest 20 per cent.

Cities have always had their smart neighbourhoods and their dangerous areas—the old cities of Europe even more so than those of the Americas, where there is more geographical and social mobility. But such social and geographical segregation has changed in pace and scale because of the growth in the urban population, the increase in "illegal" migrants and rising uncertainty.

In fact, we have entered a period of historical transition, where discontinuities prevail over adjustment. Radical changes in the nature of production and jobs and the incredible concentration of capital in the hands of the financial sector and speculators weigh much heavier in our lives these days than the state's efforts to adjust and improve the market economy. Segregation in cities has been given a new lease of life whose consequences we do not know. It has reached unprecedented dimensions because of the explosive growth of urban areas.

According to one scenario, things will go badly. The growing pace of globalization will increase uncertainty about the future. Fear and defence mechanisms will grow among people and institutions, fuelling intolerance, xenophobia and mistrust of everything new or foreign. Urban tensions will manifest themselves with increasing violence, and segregation will sharpen. Public areas will be abandoned and become dangerous no-man's-lands, the wretched abode of society's rejects. Cities will lose their original function of being a crossroads for meeting and exchange.

If globalization also continues to go hand in hand with deregulation of financial markets and an unchanged level of indebtedness of poor countries, the latter will not be able to maintain their urban infrastructures. And if on top of this there is corruption and lack of political will, challenges to the system will increase and violence will grow. Cash-strapped authorities will respond with undemocratic measures and will even ally themselves with financial mafias which provide them with funds.

According to a second scenario, everything will be all right. In line with the principle that "everything the state does is public, but the state doesn't control everything that is public," a new social contract will be drawn up between the state, the market, the working population and civil society, including NGOs. Cities will develop a new quality of life by providing citizens with a forum for exchange. Jobs will be created in the social sector, in the fields of the environment, education, research, culture and leisure, opening up possibilities for young people.

In the countries of the South, long-term development strategies will be drafted and urban planning practised, taking advantage of the opportunities provided by globalization but without falling into its traps. Town planning will become part of the political process, and the state will work with the private sector, monitored by institutions of civil society. Adequate housing will be built with the help of micro-credit and controls on the price of building materials. Improved infrastructures will enable marginal areas to become part of the civilized part of the city. Democracy will come up with new ways of governing with the help of networks of involved citizens.

In a transitional scenario, action strategies should fall somewhere between these two extremes. They should include social goals so that in big urban areas a society emerges which is founded on participatory democracy and on "capitalism with a human face" or "market socialism".

But the outlook is less clear than ever. Let us hope the present transition will lead rapidly to a new revival of humanism, whose first signs we are already seeing. This would open up the road to a development which is fair, humane and peaceful. ■

This is the era of architecture. There can be no new architecture without a new form of town planning. Over time, new cities have always replaced older ones. But today, the radiant, happy city of modern times is ready to be born.

Le Corbusier, Swiss architect and town planner (1887-1965)

© Béatrice Petit, Brussels

In Burma (above) and many other developing countries, seeds are saved and resown year after year. "Terminator" technology will put a stop to this traditional practice.

Dead-end seeds yield a harvest of **revolt**

Farmers in developing countries are up in arms against a new technique to produce sterile seeds. Scientists, however, warn that blind opposition to biotech research will do more harm than good

Ethirajan Anbarasan
Unesco Courier journalist

It was a dream come true for seed companies. Spurred by the ongoing biotechnology revolution, scientists have developed an innovative technique enabling companies to produce genetically altered seeds that do not germinate once fully grown. The result: farmers who opt for these seeds will have to buy them each time they plant a new crop, opening a potential gold mine for the seed companies.

The technique, known as the "Technology Protection System" (TPS), was jointly patented by the Delta and Pine Land (DPL) seed company and the U.S. Department of Agriculture (USDA) in March 1998. Seeds incorporating this technique are expected to be commercialized by 2005. While the innovation is welcomed by seed manufacturers, farmers in many developing countries have been conducting campaigns and staging protests—sometimes turning to violence—against the TPS, fearing the new technique could be detrimental to their interests.

At present, except for some hybrid crops like cotton and canola, farmers do not usually buy seeds for self-pollinating plants like wheat and rice. Farmers in the developing world consider it their "right" to save or exchange seeds, a practice that has been followed for more than 10,000 years.

According to the UN, more than 1.4 billion people, mainly resource-poor farmers, depend on farm-saved seeds and seeds exchanged with their neighbours as their primary seed source. Critics say that sterile seeds are a serious threat to this group of farmers, asserting that the innovation will further impoverish them.

"The introduction of any technology that prevents farmers from keeping their own seeds is not desirable. Farmers' rights include 'plant back' rights. The TPS will certainly prevent this right," says Dr M. S. Swaminathan, an eminent scientist who played a leading role in India's Green Revolution.

In India, where 90 per cent of the 100 million farmers depend on saved seeds, farm lobby groups are vehemently opposed to this new technology entering local seed markets. In the southern Indian state of Karnataka, experimental plots of genetically engineered crops belonging to Monsanto, one of the world's leading seed companies, were ransacked by a group of farmers last year in the mistaken belief that they contained the new sterile seed technology. Actually, the test site was for a pest-resistant hybrid cotton seed which had nothing to do with TPS. The public outcry forced the government to declare that it would not allow the technology to enter India. ▶

Opposition to TPS has been gaining pace in other parts of the developing world where seed saving is an age-old custom. In a statement to a conference held by the Food and Agricultural Organization (FAO) in 1998, delegates from 20 African countries said the new technique poses a serious threat to food security, affirming "it will destroy the diversity, the local knowledge and the sustainable agricultural systems of African farmers."

Scientifically, the TPS is considered a milestone in biotechnology research. The new method produces plants that bear sterile seeds through an interplay between three transplanted genes, one of which produces a toxin that kills seeds in their final stages of development. Critics however refer to it as "terminator technology" because of the technique's ability to neutralize a plant's germinating capacity—a characteristic introduced for purely commercial reasons.

"The new technique is to protect U.S. technology and seed patents," explains Melvin Oliver, one of the USDA scientists who invented the technology. The TPS is now being tested on tobacco and cotton seeds which are expected to enter the market by 2005.

When news of the terminator patent broke, it sparked a multi-media debate, especially on the Internet, concerning the ethics and social relevance of introducing the TPS in developing countries. The USDA received hundreds of e-mail letters from around the world questioning the validity of the new method.

Taken aback by the anti-sterile technology campaign, Monsanto seed corporation, which is in the process of acquiring DPL, announced in April this year that it will not commercialize the TPS until an independent international review of its environmental, economic and social effects is completed.

In defending the TPS, seed companies underline that it costs them between $30 and $100 million to develop a high-yielding genetically engineered seed variety. The present system of seed saving, which is prevalent in most developing countries, makes it difficult for them to gain sufficient returns on their investment. Losses have even forced some companies to suspend crop development programmes.

The threat to biodiversity

But a number of farming experts and organizations reject this logic. "I do not consider that the cost spent by seed companies can be recovered only by terminator technology. In fact, most successful seed companies are those whose seeds have a reputation for quality and affordable price," says Swaminathan.

Critics of terminator technology also argue that poor farmers in the tropics not only produce 15 to 20 per cent of the world's food supply, they also maintain crop varieties that are a source of genetic diversity for the world's plant breeders and genetic engineers. For example, the Manila-based International Rice Research Institute (IRRI) relies on traditional rice varieties collected from farmers in many parts of the world to develop new high-yielding seeds (see pages 46 to 50).

"If farmers eat or abandon their traditional seeds in the process of adopting terminator seeds, centuries of crop genetic diversity could be lost forever," says Pat Mooney, Executive Director of the Canada-based Rural Advancement Foundation International (RAFI), a non-governmental organization which is spearheading an international campaign against terminator technology.

Pointing to another worse-case scenario, some scientists fear that the TPS trait could spread to other crops if pollen carrying a terminator gene lands on plants in neighbouring fields. "Plants in the neighbouring crop would then produce seeds that would not germinate," says Rob Marchant, a research associate at Nottingham University (United Kingdom). If this happens, there is a danger that farmers who opt for normal seeds may end up having sterile ones because of crops with the terminator trait in adjacent fields.

To safeguard farmers in developing countries, Swaminathan would like to press UNESCO's Bioethics committee to draft a Universal Declaration on the Plant Genome and Farmers' Rights, similar in spirit to the one adopted by UNESCO in 1997 on the Human Genome and Human Rights. This

A protest against genetically modified organisms is held during an international meeting of experts in Cartagena (Colombia) in February 1999.

© Carmelo Bolanos-AP/Boomerang, Paris

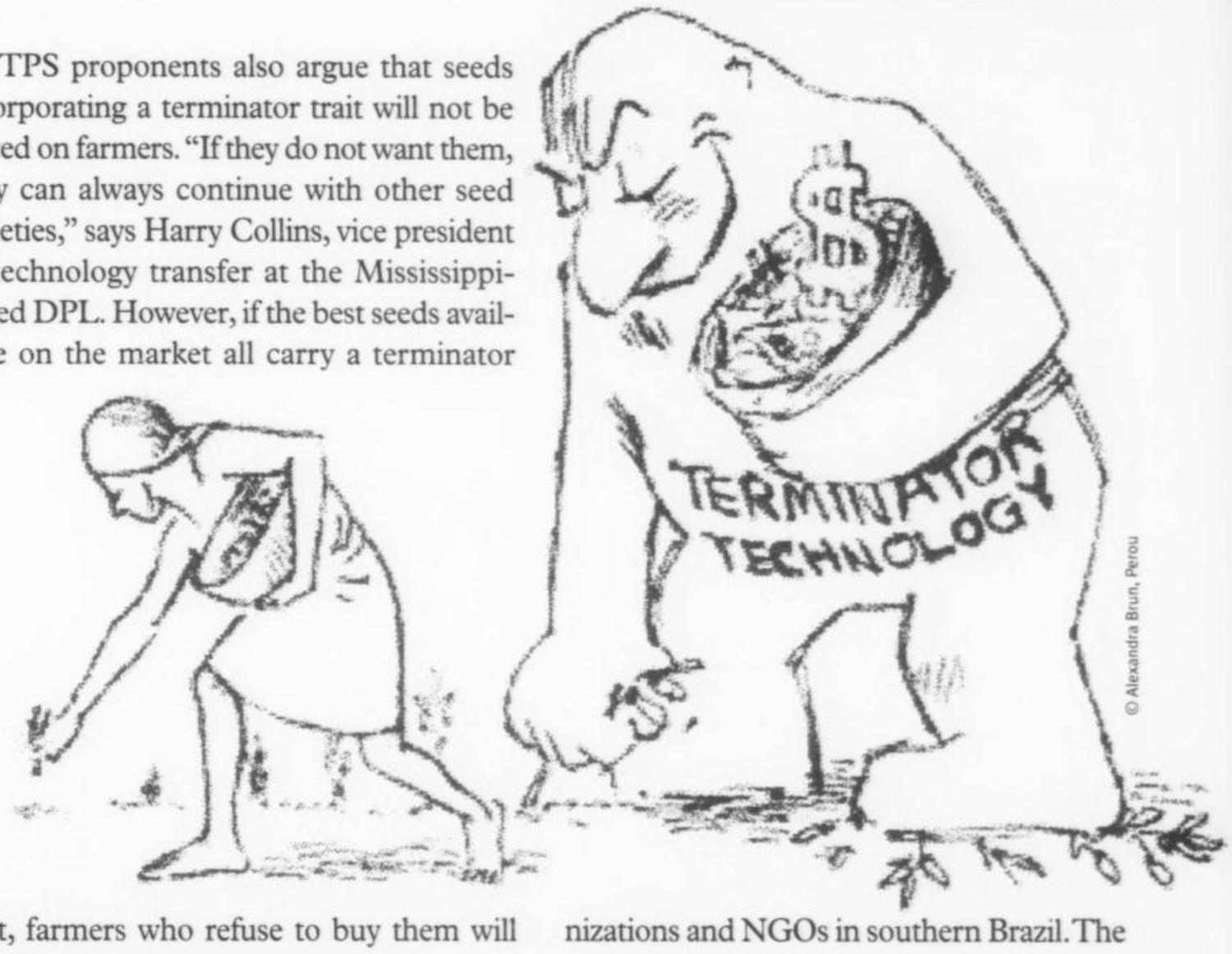
Declaration expresses rights and principles that should govern research on the human genome, emphasizing the pre-eminence of human dignity.

A backlash against biotechnology

While the debate over the TPS is heating up, scientists are concerned that the controversy is leading to growing anti-biotechnology feelings in many developing countries. Some environmental groups in South Asia have even called for a total ban on genetically engineered seeds, fearing they could cause harm to human beings.

"There are growing misconceptions about genetic research. The myths have to be dispelled. The fact is that biotechnology is the only solution if we want to increase world food production to meet future demands," asserts Dr Arie Altman, professor of horticulture at the Hebrew University of Jerusalem. Pointing to declining food production in some Asian countries, he says that the process of the Green Revolution, which helped many nations in the region boost food output in the 1960s and 70s, has clearly reached saturation level. "So genetically engineered crops are the only solution to increase yield," claims Altman.

TPS proponents also argue that seeds incorporating a terminator trait will not be forced on farmers. "If they do not want them, they can always continue with other seed varieties," says Harry Collins, vice president of technology transfer at the Mississippi-based DPL. However, if the best seeds available on the market all carry a terminator trait, farmers who refuse to buy them will be left with ones of inferior quality.



© Alexandra Brun, Perou

The trend towards concentration on the seed market is also likely to limit choice. RAFI maintains that the top 10 seed corporations control 30 per cent of the $23 billion seed market worldwide. In the last few years Monsanto has become one of the world's largest seed companies, and is therefore in a position to make direct use of terminator technology across the globe.

'After the terminator patent, 29 patents along similar lines have been obtained by 12 European and U.S. seed companies seeking to exploit new engineering techniques for profit motives'

But who will take the initiative of developing new seed varieties? Government spending worldwide has been minimal in agricultural biotechnology, while the private sector has been pumping millions of dollars into research and development in this field. Now, they are not willing to invest more in self-pollinating crops like wheat and rice unless returns are ensured, and perceive the TPS as one way of achieving this.

DPL officials claim that pest-resistant wheat and rice seeds can be developed in the next six to seven years, significantly boosting global food production. But they contend that once such high-yielding varieties enter the market, it will be difficult to monitor the patenting rights because they are mass-cultivated crops. At present, some seed companies oblige farmers to sign a contract affirming that they will not re-use the seeds purchased. To enforce this, companies send inspectors to monitor farmers' activities. While such a system is already difficult to implement in the U.S., where rigid patent rights exist, it is next to impossible in the developing world. "The TPS is essential to safeguard the patents of new varieties," says Oliver.

Realizing that this technology could be a money-spinner, other seed companies have jumped into the fray. "After the terminator patent, 29 patents along similar lines have been obtained by 12 European and U.S. seed companies seeking to exploit new engineering techniques for profit motives," says Mooney.

RAFI is not is the only outfit lobbying against the TPS. The Consultative Group for International Agricultural Research (CGIAR), the world's largest organization in this field, is opposed to introducing the technology in developing countries and has banned its use in its 16 agricultural research institutes.

In January 1999, more than 50 non-governmental organizations and farm-lobby groups from South American nations assembled in Ecuador to form a coalition against terminator technology entering the continent.

"Poor farmers will get nothing out of it. We are not only against terminator but against all transgenic seed varieties. It doesn't give poor farmers any advantages," says Silvia Ribeiro, who works with a coalition of farmers' organizations and NGOs in southern Brazil. The network has scheduled a series of public meetings and demonstrations throughout Brazil in the coming months to create awareness among farmers about the TPS. Some local governments in Brazil have already banned the entry of terminator seeds once they become available in five to six years.

Biotech proponents argue that the negative reaction to terminator seeds is premature. "If the new seeds are going to increase the yield by 15-20 per cent, farmers will not mind paying for the seeds," says C. S. Prakash, Director of Plant Biotechnology Research at Tuskegee University in the U.S., and consultant for Monsanto.

Farmers in the U.S. are already experiencing the benefits of insect-resistant and herbicide-resistant crops through higher yields and profits. Transgenic insect-resistant maize saved U.S. farmers an estimated $190 million in 1997 and substantially reduced insecticide use.

Not all developing countries oppose agricultural biotechnology. Farmers in China and Argentina, for example, have responded favourably to genetically engineered seeds. Chinese farmers have been successful in cultivating hybrid cotton seeds and buy them every year from the companies. "Farmers are the best judges. They know what is economically beneficial for them. If they find that the terminator trait is unviable, they themselves will reject it," says Prakash. ■

Some useful Websites:

- **http://www.rafi.org**
- **http://www.mssrf.org**
- **http://www.ars.usda.gov/misc/fact.htm**
- **http://www.monsato.com**
- **http://www.oneworld.org/panos**

Cracking the code of art's allure

Anthony Freeman
Managing editor,
Journal of Consciousness Studies

A bold new theory to identify the common denominator of all visual art

'If a Martian ethologist were to land on earth and watch us humans, he would be puzzled by many aspects of human nature, but surely art—our propensity to create and enjoy paintings and sculpture—would be among the most puzzling. What biological function could this mysterious behaviour possibly serve?

"Cultural factors undoubtedly influence what kind of art a person enjoys. But, even if beauty is largely in the eye of the beholder, might there be some sort of universal rule or 'deep structure', underlying all artistic experience?"

Vilayanur S. Ramachandran, Director of the Center for Brain and Cognition at the University of California at San Diego, has made a bold and controversial attempt to answer these intriguing questions by proposing a new scientific theory of art. The theory explains many familiar experiences, such as why a cartoon squiggle can evoke a well-known face more quickly than a full colour photograph, and why many men find the hour-glass figure of Marilyn Monroe sexy.

Professor Ramachandran's theory addresses three questions: (a) What are the "rules of art" that make something pretty? (b) Why did these rules evolve and have the form that they do? (c) What is the brain circuitry involved? Previous theories of art have looked at one or two of these questions, but this is the first time all three have been tackled together.

With his colleague William Hirstein, Ramachandran proposes a list of "Eight laws of artistic experience . . . that artists either consciously or unconsciously deploy to optimally titillate the visual areas of the brain," in particular that part of the brain known as the limbic system. Of the eight (see box page 42), three seem to be especially significant: a psychological phenomenon called the "peak shift effect"; the principle of "grouping"; and the benefit of focusing on a single visual cue.[1]

The 'peak shift effect'

The "peak shift effect" is a well-known principle in animal discrimination learning. For example, if a rat is taught to discriminate a square from a rectangle and rewarded for the rectangle, it will soon learn to respond more frequently to the rectangle. Moreover, if the rat is trained with a prototype rectangle of, say, aspect ratio 3:2, it will respond even more positively to a longer and skinnier figure—say, of aspect ratio 4:1. This curious result implies that what the rat is learning to value is not a particular rectangle but a rule: rectangles are better than squares. So the greater the ratio between the long and the short sides, i.e. the less square-like it is, the "better" the rectangle is in the rat's eyes. This is the "peak shift effect". Ramachandran argues that this principle holds the key for understanding the evocativeness of much of visual art.

© Ramachandran Collection

Figure 1. The accentuated features of a bronze statue of the Indian goddess Parvati (circa 11th century A.D.), amplify the essence of the feminine to produce a "peak shift effect".

How does the peak shift effect relate to human pattern recognition and aesthetic preference? Consider the way in which a skilled cartoonist produces a caricature of a famous face, say the late U.S. President Richard Nixon's. What a cartoonist does (unconsciously) is to take the *average* of all faces, subtract it from Nixon's face (to get the difference between Nixon's face and all others) and then *amplify* the differences to produce a caricature. The final result, of course, is a drawing that is even more Nixon-like than the original. The artist has amplified the differences that characterize Nixon's face in the same way that an even skinnier rectangle is an amplified version of the original prototype that the rat is exposed to. Hence Ramachandran's aphorism that "All art is caricature". (This is not literally true, as he admits, but it applies surprisingly often.) In other words, what the artist tries to do is not only capture the essence of something but amplify it in order to activate neural mechanisms more powerfully than the original object.

Look at the Chola bronze—the accentuated hips and bust of the Goddess Parvati (Fig. 1) and you will see at once that this is essentially a caricature of the female form. Here the artist has chosen to amplify the "very essence" (called the *rasa* by Hindu artists) of being feminine, by moving the image abnormally far toward the feminine end of the female/male spectrum. The artistic amplification produces a "super stimulus" to which, Ramachandran conjectures, certain brain circuits respond. Artists may also try to evoke a strong direct emotional response by exploiting the peak shift effect along dimensions other than form. For instance, a Boucher, a Van Gogh, or a Monet may be thought of as a caricature in "colour space".

Perceptual grouping and binding

A second basic principle suggested by Ramachandran is "grouping" (or binding). The way this works can be illustrated by the Dalmatian dog picture shown in Fig. 2. This is seen initially as a random jumble of splotches. The number of potential groupings of these splotches is infinite, but once the dog is seen, your visual system links only a subset of these splotches together and it is impossible *not* to "hold on" to this group of linked splotches. Indeed, the discovery of the dog

1. V.S. Ramachandran and William Hirstein are publishing a fuller exposition of this subject later this year in the *Journal of Consciousness Studies* under the title "The Science of Art, A Neurological Theory of Aesthetic Experience".

and the linking of the dog-relevant splotches generates a pleasant "aha" sensation. In "colour space" the equivalent of this would be wearing a blue scarf with red flowers if you are wearing a red skirt; the perceptual grouping of the red flowers and your red skirt is aesthetically pleasing. Artists understand the pleasure given by such effects.

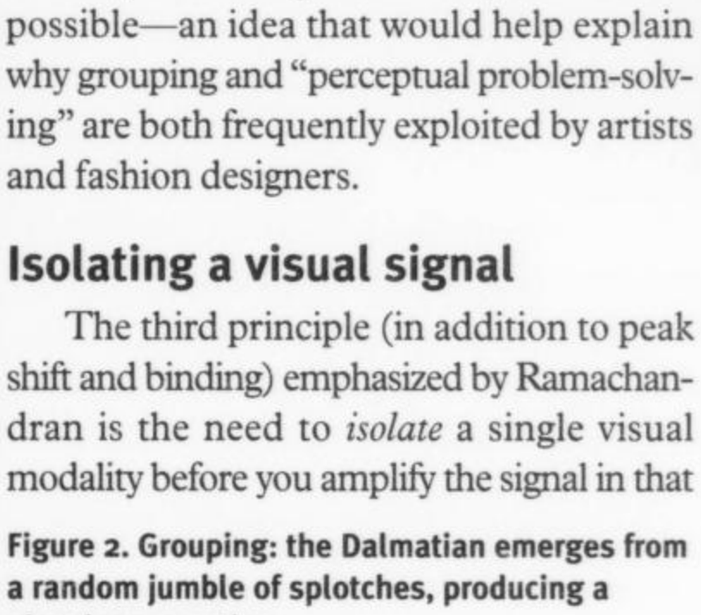
The evolutionary value of such grouping of stimuli to pick out objects is obvious: it makes the detection of both prey and predators much easier. But how is such grouping achieved? The key idea is as follows. Given the brain's limited attentional resources and shortage of neural space for competing representations, *every* stage in the processing of visual information offers an opportunity to generate a signal that says, "Look, here is a clue to something potentially object-like!" Partial solutions or conjectures to perceptual problems are fed back from every level in the hierarchy to every earlier module to impose a small bias in processing, allowing the final percept to emerge from such progressive "bootstrapping".

Consistency between partial high-level "hypotheses" and earlier low-level ensembles generates a pleasant sensation—e.g. the Dalmatian dog "hypothesis" encourages the binding of corresponding splotches which, in turn, further consolidate the "dog-like" nature of the final percept and we feel good when it all finally clicks in place. And what the artist tries to do is to tease the system with as many of these "potential object" clues as possible—an idea that would help explain why grouping and "perceptual problem-solving" are both frequently exploited by artists and fashion designers.

Isolating a visual signal

The third principle (in addition to peak shift and binding) emphasized by Ramachandran is the need to *isolate* a single visual modality before you amplify the signal in that

Figure 2. Grouping: the Dalmatian emerges from a random jumble of splotches, producing a pleasing sensation.



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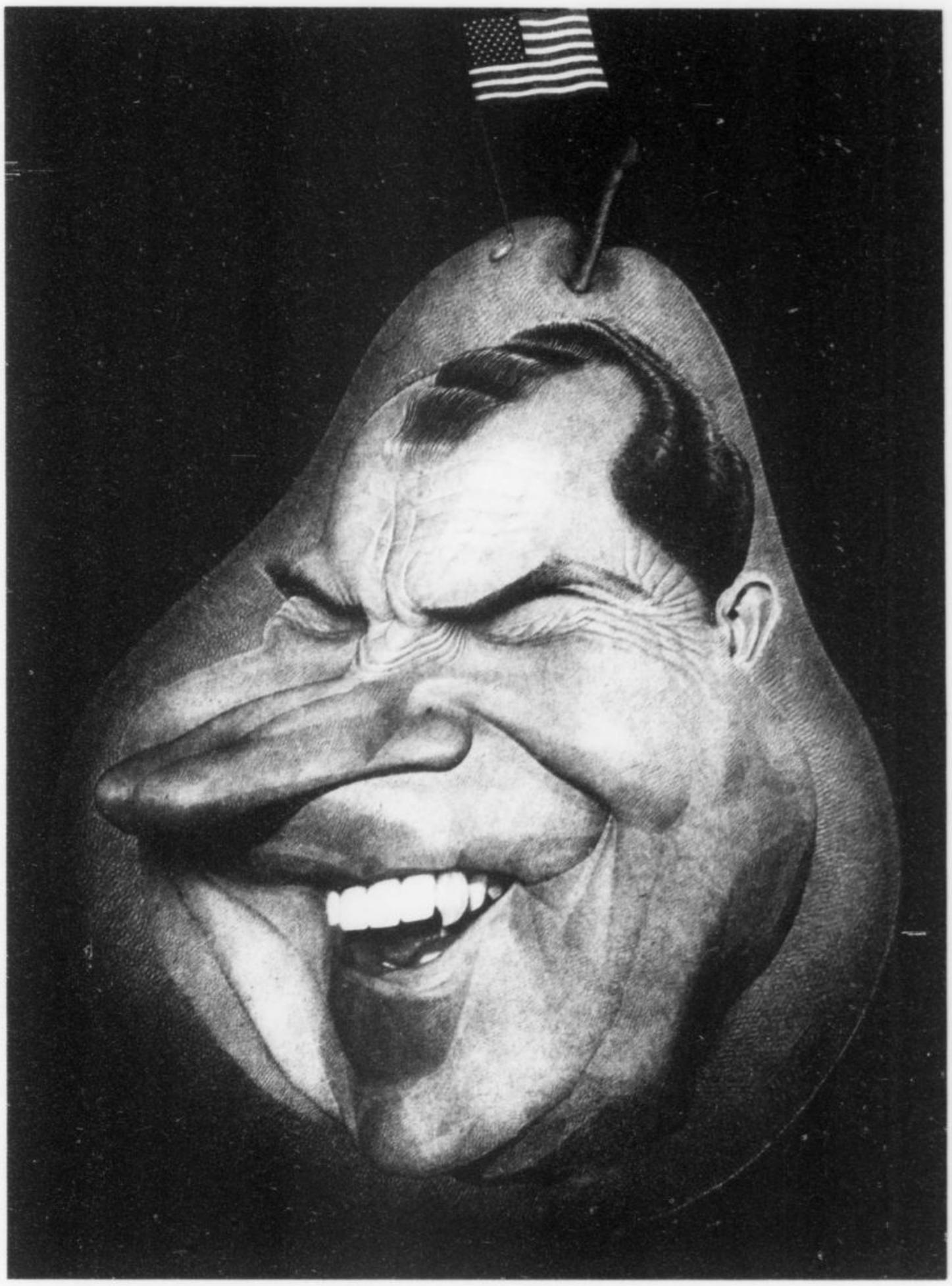


© Jean Mulatier/Cartoon Co., Paris

Figure 3. A caricature of Richard Nixon by the French cartoonist Mulatier.

modality. The brain's ability to do this explains why an outline drawing or sketch is more effective as "art" than a full colour photograph. Consider a full-colour illustration of Nixon, with depth, shading, skin tones and blemishes, etc. What is unique about Nixon is the form of his face (as amplified by the caricature), but the skin tone—even though it makes the picture more human-like—doesn't contribute to making him "Nixon-like" and therefore actually detracts from the efficacy of the form cues. This explains why one not only "gets away" with just using outlines—they are actually more effective than a full-colour half-tone photo, despite its having more information. Hence the aphorism "more is less" in Art.

Additional evidence for this view comes from the "savant syndrome"—autistic children who are "retarded" and yet produce beautiful drawings. The animal drawings of the eight-year-old artist Nadia, for instance, are almost as aesthetically pleasing as those of Leonardo da Vinci (Fig. 4). Ramachandran argues that this is because the fundamental disorder in autism is a distortion of the "salience landscape"; savants shut out many important sensory channels, thereby allowing them to deploy all their attentional resources on a single channel.

'Lie detector' testing

Ramachandran believes that the "peak shift principle" can be tested directly. The method would employ skin conductance response (SCR), the technology used in "lie detectors". The size of the SCR is a direct measure of the amount of limbic (emotional) activation produced by an image. It is a better measure, as it turns out, than simply asking someone how much emotion they feel about what they are looking at, because the verbal response is ▶

© Taken from *Nadia*, by Lorna Selfe, Academic Press, 1977, New York

Figure 4. The savant syndrome: horses drawn by Leonardo da Vinci (right) and by an eight-year old autistic child.

▶ filtered, edited, and sometimes censored by the conscious mind. Measuring SCR allows direct access to "unconscious" mental processes.

The experiment would compare a subject's SCR to a *caricature* of, say, Einstein or Nixon, to his SCR to a *photo* of the same individuals. Intuitively, one would expect the photo to produce a large SCR because it is rich in cues and therefore excites more modules. If one found, paradoxically, that the caricature actually elicited a larger SCR, this would provide evidence for the operation of the peak shift effect—the artist would have unconsciously produced a super stimulus.

Critical responses

Ramachandran says that one could also compare the magnitude of an SCR to caricatures of women (or indeed, to a Chola bronze nude or a Picasso nude) with the SCR to a photo of a nude woman. It is conceivable that the subject might claim to find the photo more attractive at a conscious level, while registering a large "unconscious aesthetic response"—in the form of a larger SCR—to the artistic representation. That art taps into the "subconscious" is not a new idea, but our SCR measurements may be the first attempt to test such a notion experimentally.

Not surprisingly, Ramachandran's attempt to reduce aesthetic experience to a set of physical or neurobiological laws has already met with stout criticism. A symptom of trouble to come has been seen in his use of the term "pretty". If used at all by serious art critics, the word damns with faint praise. Prettiness is not seen as a synonym for beauty, but as a shallow impostor. Yet Ramachandran uses it without irony as a positive attribute. This one piece of unfortunate terminology might be forgiven, but other elements in his work are all of a piece with it.

First, there is the heavy reliance on the female form and upon the erotic in his examples. Then he seems to equate "arousal" (as measured by SCR) with a positive aesthetic response—an assumption felt by critics to presuppose the reductionist case he is trying to prove. Taken together, these points seem to some critics to confuse pornography with high art.

The "science of art" has also been attacked from the scientific side, on the grounds that its proponents have not yet conducted any serious empirical tests of their ideas. At best they have offered a manifesto for a research programme and made some suggestions for possible lines of investigation. Even then, it has been pointed out that the narrow range of examples used hardly justifies the lofty claims to be dealing with the whole of art, let alone to have uncovered the "laws of aesthetic experience". Nor has hitching his bandwagon to the Buddhist train, by associating his "eightfold laws" with the Buddha's eightfold noble path won Ramachandran any friends, though to be fair, he admits himself that this is a slightly whimsical association.

Criticism has centred on the lack of proportion between the narrow approach to art taken by Ramachandran and the grandiloquent claims he makes for his theory—although, as he admits, he initially proposed it "in a playful spirit". But the very audacity with which its author propounds it guarantees that we shall be hearing a lot more of it in the coming months. ■

The **eight laws** of artistic experience

1
The 'peak shift principle' makes exaggerated elements attractive

2
Isolating a single cue helps to focus attention

3
Perceptual grouping makes objects stand out from background

4
Contrast is reinforcing

5
Perceptual 'problem solving' is also reinforcing

6
Unique vantage points are suspect

7
Visual 'puns' or metaphors enhance art

8
Symmetry is attractive

A virtual **library** on the Web

Sophie Boukhari
UNESCO Courier journalist

Untold riches await anyone who can tap into the public libraries now available on the Internet. But stiffening copyright law could rein in the trend

Publisher Eric Eldred belongs to a breed of diehards who see the World Wide Web as a way to fulfill ideals rather than make money. "Very much like UNESCO, we feel a responsibility to our public—all human beings on the earth—to preserve our culture of books and art and make it available to as many as we can," he says. "We are now blessed with a great deal of free computer power and we would like to turn this to good use."

Since 1995, Eldred, the American founder of Eldritch Press, has published on the Web great classics of literature whose copyright has expired and which have therefore fallen into the public domain. He wants to build up a virtual library for university literature students and high-school pupils like his triplet daughters.

From Victor Hugo to the *Kama Sutra*

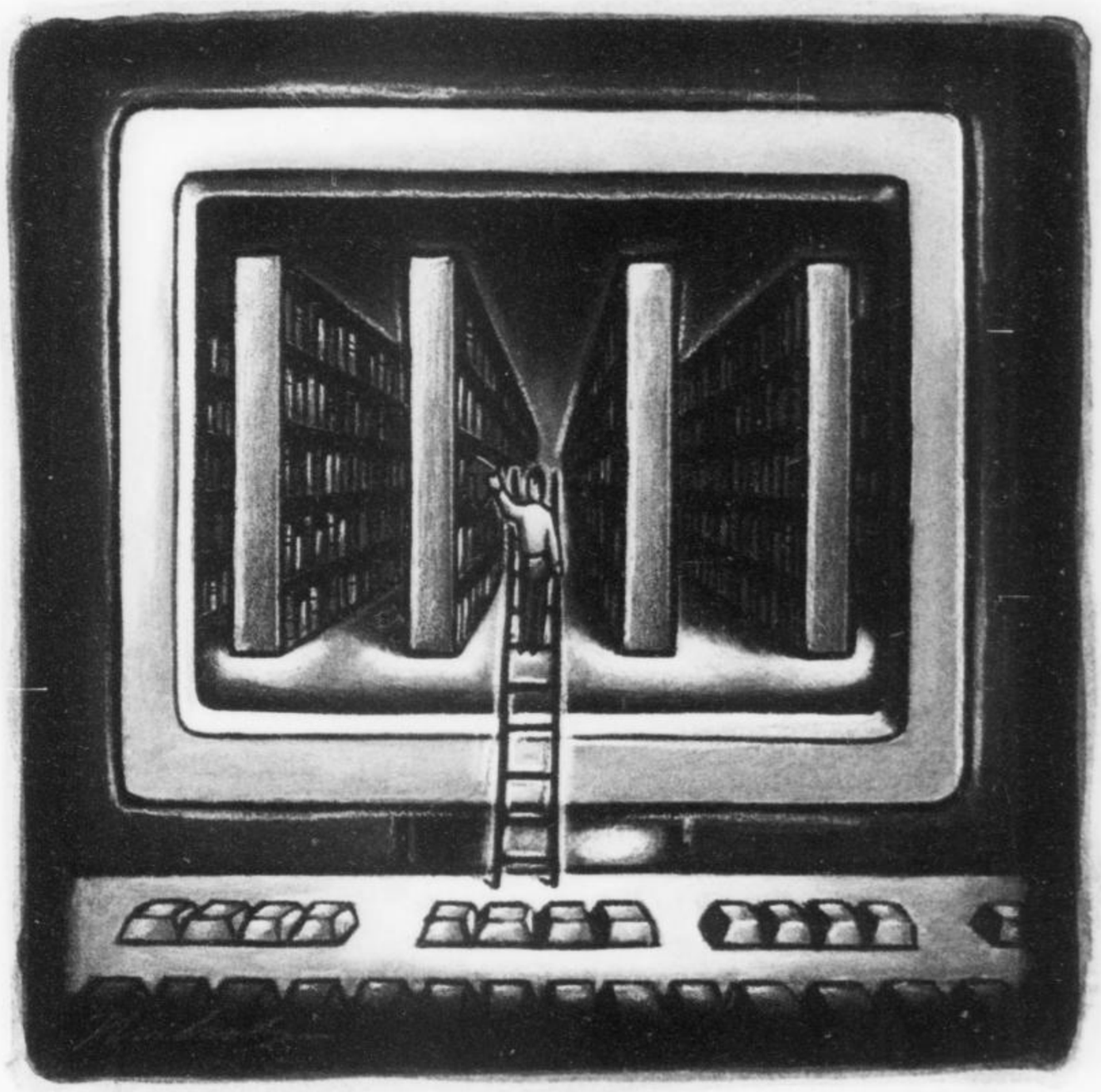
Eldred is not the only person fighting to make culture more accessible and widespread in cyberspace than in the "real" world. In the industrialized countries, such as the United States, plenty of moves are afoot to freshen up the tired old image of the public library. In recent years, millions of pages of the works of the greatest writers, historians, poets and philosophers have been scanned[1] onto the Internet or, in some cases, simply re-typed and put online.

So far, such digitalized material consists mainly of Anglo-Saxon classics or products of Western culture translated into English. For example, you can download from the Web into your computer the writings of Aristotle, Oscar Wilde, Tolstoy, Victor Hugo, and a handful of Arab, Persian and Chinese authors, plus the *Kama Sutra*. You don't need to go hunting for a book that you can, in this way, keep, print out, annotate and use as you wish or forward to your friends.

These freely-available virtual libraries have been set up by determined individuals, NGOs, universities, governments and international organizations. The Gutenberg Project and The Oxford Text Archive (OTA) are the pioneers (see page 45). On a bigger scale, national libraries have begun the monumental task of digitalizing all the hundreds of thousands of documents and pictures they possess.

The first to take the plunge are the French National Library (BNF) and the U.S. Library of Congress, says Sonia Zillhardt of the BNF. "Others have begun working on the project in the past three years but some are still at an experimental stage. Most don't have enough money to do it." Scanning a page costs between one and four dollars, so millions are needed to process whole collections. But the hardest part is overcoming the conservatism of some cultural officials who have to be dragged into cyberspace.

"Every country should provide easy access to documents in the public domain," says Zillhardt. "The policies of different states must converge in the new environment of the world information society." This is the aim of the Bibliotheca Universalis (BU) project which was launched in 1995 by the G7 group of the world's seven richest countries, joined last year by Russia, and now links 13 countries in all. "They ▶



© Gary Nichols/SIS, Paris

Classics of world literature are now available for free on the Internet.

1. "Photographing" a page by computer and transferring its contents to a computer's memory.

© Taken from *Nadia*, by Lorna Selfe, Academic Press, 1977, New York

have to work out between them who is digitalizing what, as well as establish shared communication norms," says Zillhardt.

But there's many a slip twixt cup and lip. Each national programme goes at its own speed, with its own priorities (such as U.S. history in Washington or material about the great Portuguese explorers in Lisbon) and its own technical norms. On top of that, current computer programmes do not allow people to switch from a document in Japanese or Arabic to one in the Latin alphabet.

By the end of the year, everyone involved in the BU project should have pledged to put together an initial shared collection of works on the theme of exchanges between different peoples. But how many years will it be before Japanese researchers can make a request in their own language and come up with documents from all the associated libraries? And how much longer than that will it be before a student in Burkina Faso can make use of such a tool?

At first sight, virtual libraries seem like a godsend for people in poor countries, giving them access to the world's collective memory, which is concentrated in the rich countries. They just need a computer, an Internet connection and some money. "Web access is still very much a dream in many developing countries and the cost of international phone connections there is prohibitive," says Philippe Quéau, UNESCO's director of information and computing. "Fetching material off the Web takes time and is expensive—several dollars an hour in Africa, for example."

Does this mean online culture is beyond the reach of poor countries? No, but they have to develop two kinds of services. First, the local creation of "mirror" sites[2] of online libraries, which are accessible for the cost of a local phone call. And then encouraging the distribution of works in the form of CD-Roms, which cost less than a dollar to copy. UNESCO has launched a collection called Publica and will soon put out a CD-Rom of the great Arabic classics. But it is having a hard job bringing out a similar one on French-language literature.

"For two years I've been up against the inertia of French officialdom which doesn't want to get into a fight with the publishers, even though the works I want to put on CD-Rom have come into the public domain," says Quéau, who deplores the rampant privatization of the public domain for profit, "either by extending the life of a copyright or by making use of technology."

Privatization of the public domain

Both these types of privatization are in the works. Microsoft's new Windows 2000 programme will make it easier to read texts on the screen, a sign that "e-books" could soon be on sale in the bookstores. We could download and read hundreds of works on such small book-sized computers. But would they, as Eldred fears, become "anti-books" which couldn't be freely exchanged? To keep its monopoly, the computer industry would just need to impose a technical norm to enable e-books to be read. Works in the public domain would then have to be electronically edited and so would once more fall under a copyright.

Intellectual property laws are also getting tougher. A European Union directive in October 1993 extended the copyright on an author's works from 50 to 70 years after his or her death. "It seems reasonable to us to cover two generations of the author's descendants, as international law stipulates and in view of today's greater life expectancy," says Anne Bergman, an adviser to the Federation of European Publishers.

The trend is the same in the United States, where the life of a copyright has grown from 28 years at the beginning of the century to 75 years last year. The U.S. Congress extended this by a further 20 years last October when it passed the Sonny Bono Copyright Term Extension Act. Some people are even campaigning for unlimited copyright, or one for eternity minus a day. The "minus one day" is to avoid charges of unconstitutionality, since U.S. federal law forbids unlimited copyright.

The aim is also to encourage authors' creativity, not to provide their heirs and copyright holders with an endless source of income, says Eldred. He claims the new law is unconstitutional and filed a suit in January 1999 to get it struck down. A first decision will be made in July 1999 and the matter should go all the way to the Supreme Court, says legal expert and Harvard professor Lawrence Lessig, who backs Eldred. Congress has no right, he says, to limit the public domain as a whole and extend the monopoly of a few private groups, like Disney and the film industry, which lobbied very hard to get the Bono Law passed.

"In five years' time, Mickey Mouse was to enter the public domain and Disney would have lost the ability to control duplication of Mickey Mouse films," says Lessig. "The same with the film industry. Ted Turner is another big winner. He's just purchased the Metro Goldwyn Mayer archive, which now has a 20-year additional life for him."

"The public domain is the wellspring of our culture," says Eldred. "Think of how much Disney has taken from works that are no longer under copyright. Think of how silly it would be if you had to pay 7.5 cents to an author each time your child sang 'Happy Birthday' in public!" ■

'In five years' time, Mickey Mouse was to enter the public domain and Disney would have lost the ability to control duplication of Mickey Mouse films. The same with the film industry. Ted Turner is another big winner. He's just purchased the Metro Goldwyn Mayer archive, which now has a 20-year additional life for him.'

2. A local copy of an original site based in another country.

Website of the month

http://www.un.org/pubs/CyberSchoolBus/humanrights/

Everyone everywhere has human rights, but not everyone everywhere respects them. What are they and how are they protected? Teachers and students around the world are always looking for materials to help them understand this complex issue.

The UN *Human Rights in Action* project is an answer—presented in plain language, in English, French and Spanish. The project aims not just to teach, but to encourage students to act. It collects stories of classes or schools defending and promoting human rights in their communities which will, in turn, become part of a global compendium published online. ■

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- **Eldritch Press: eldred.ne.mediaone.net/**
- **Berkman Center for Internet and Society, Harvard: cyber.law.harvard.edu**
- **Bibliotheca Universalis: www.konbib.nl/gabriel**
- **UNESCO: www.unesco.org/webworld/public domain/public inf.html**
- **The Internet Classics Archive/MIT: Internet: www.literature.org/works/**

2,000 world classics **on line**

Sam T. Weller
Chicago-based journalist.
Correspondent for *Publishers Weekly.*

Relying on the sole efforts of volunteers, Project Gutenberg has been launching the world's literary heritage into cyberspace for nearly 30 years while conducting a crusade against copyright restrictions

When Michael Hart, a student at the University of Illinois, was given a free Internet account, he spent an hour pondering the potential of the gift, then typed in the American Declaration of Independence and sent it to everyone on the networks. Project Gutenberg had just been born.

That was back in 1971, when only 23 computers in the U.S. were online and computer memories were small. Believing that the greatest value created by computers would be the storage and retrieval of library materials, Hart continued his project with the U.S. Constitution, the books of the Bible and Shakespeare's plays. As computer power increased, he launched into book-length manuscripts, beginning with a popular classic, *Alice in Wonderland.* Today, there are 160 million Internet accounts globally and Michael Hart's free cyber-library just posted its 2,000th title: Cervantes' *Don Quixote,* in Spanish. While the majority of titles are in English, the library also comprises a handful in French, Italian and Latin.

© Pietro Di Miceli; U.S.A.

Project Gutenberg's founder Michael Hart, a self-described "blue-collar rebel".

Idealistic and utilitarian

Although he claims he's never read a computer manual, Hart, the son of a professor specializing in Shakespeare and a mathematician, is a child of the information age, a recluse who prefers to communicate via e-mail from his home in Urbana, Illinois. "I started the project because I am idealistic and utilitarian," says Hart, a self-described blue-collar rebel.

"Michael Hart should be as famous as Bill Gates," asserts *Chicago Tribune* computer columnist Jim Coates. But Hart has never truly reaped the material reward from being the first to post texts on the net. Project Gutenberg is a non-profit enterprise, entirely funded through donations. Its first grant came from Apple, and others followed from such outfits as Hewlett Packard, IBM and Microsoft, whether in the form of super scanners or dollars.

"We don't have a budget of any kind," asserts Hart flatly. The project, which averages 36 new books a year, relies on some 1,000 volunteers. Nor is there an editorial committee. Volunteers are encouraged to choose books they'd like to add to the library, as long as they fall into the public domain, which restricts the selection to pre-1923 works. They scan and proof the books before sending them to Hart, who puts them online in Plain Vanilla ASCII, the most widespread code for information interchange.

Hart's technique has its critics. In England, the Oxford Text Archive comprises over 2,500 online titles specifically geared to the academic community. Hence the importance of enriching the raw text with footnotes and choosing the most widely respected edition of a work. Such details are far from Hart's chief concern. In his wish to make classics available to the masses, his greatest crusade is against copyright law. Since the launching of Project Gutenberg, the time period of copyright in the U.S. has been extended twice, which according to Hart, "eliminated two million books from lists we could be using." Hart has been threatened by dozens of lawsuits, reportedly for digitalizing editions of books that are still covered by copyright.

Many publishers claim that the Gutenberg project is no threat to business. Northwestern University Press, for example, recently published the complete works of Herman Melville, which are also available free of charge from Project Gutenberg. "This is public domain material," says Nicholas Weir-Williams, director of Northwestern University Press. "The Melville material on the web doesn't damage our sales." "You could put full texts of every book you publish on the net," adds Walter Lippincott, director of Princeton University Press, "and it wouldn't hurt sales. I don't think anybody wants to read very much online. And who wants to sit there and print out hundreds of pages?"

On the contrary, Hart predicts a bright future for e-texts, if only for very simple reasons. "Most people don't have 2,000 books in their entire home," he says. "You can now fit that many books on one disk, for free." But peering into his crystal ball, he also foresees public domain copyright laws extending on. "If this is, indeed, the information age, I ask: 'the information age . . . for whom'?" ■

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- **Project Gutenberg: www.gutenberg.net.**
- **The Oxford Text Archive: ota.ox.ac.uk/index2.html**

Gurdev Singh Khush:

© Jesse Victolepo/IRRI/Manila

An architect of the Green Revolution* is now trying to bring about a "Green Green Revolution" to avert a food crisis in the coming decades

Experts have warned of a possible food crisis in Asia in the coming decades due to population growth combined with lowered rates of food production. Is there a possibility of famine surfacing again in some Asian countries?

The Asian region will definitely face food shortage some time in the future if present trends continue. In most Asian countries, where the staple food is rice, population growth has not yet stabilized and the demand for food is increasing. According to UN estimates, by 2020 the world population will have swollen to around 8 billion people, 5 billion of whom will be rice consumers. We estimate that the world's rice harvest must increase from the present 560 million tonnes to 840 million tonnes per year to meet the demand. All this has to come from existing agricultural land, as no more cropland is available in many countries. While increasing food production, the Asian countries should also think about active population control programmes.

How fast is food growth increasing to meet the demand?

Unfortunately food production is not keeping pace with population growth. Between 1960 and 1990, global food production was increasing at a rate of 2.8 per cent per year while population grew at a rate of between 2.1 and 2.2 per cent. So there was not much of a problem. However, the situation changed in the 1990s. Now population is increasing at the rate of 1.8 per cent whereas food production is growing at a rate of 1.5 per cent per year. Investment in irrigation has virtually ceased and good land is being lost to industrialization. If present trends continue, it will not be possible to meet future demand for food.

To what extent can new technologies help to boost yields? Where is rice research heading?

We now have rice varieties which have a yield potential of about 10 tonnes per hectare. However, the present average yield of irrigated rice in Asia is around 5 tonnes per hectare under best management. To increase the average output to 8 tonnes, we have to fine-tune the production system and invest more in irrigation and in educating farmers about new technologies. We are confident that by early in the next century, new seed varieties with a yield potential of 12 to 12.5 tonnes per hectare will be available.

The future of rice research will be oriented more towards eco-friendly agriculture. Rice breeders worldwide are now developing new rice plants which are drought-resistant and pest-resistant, and have the inbuilt capacity to outgrow weeds. In the next 30 to 50 years, temperature-sensitive rice plants will also be needed with tolerance to higher temperatures because of global warming.

What is the next step for the International Rice Research Institute (IRRI)?

At the IRRI, our next aim is to bring about a "Green Green Revolution" to produce more rice from less land and water, and without chemical pesticides or herbicides. For this we have developed a new plant type, called "Super Rice", which is in the experimental stages. This new plant, a product of conventional breeding methods, will have an entirely different architecture from that of our earlier seed varieties.

In IR8, the first high-yielding rice variety, half of the plant's weight is grain and half is straw, whereas the new Super Rice plant is 60 per cent grain and 40 per cent straw. This new variety will have increased photosynthetic capacity, directing more energy into grain production and less into foliage. An early prototype of this new plant was developed a few years ago and now we are working to improve the grain quality and to incorporate genes that will give the seed variety disease and pest resistance so that farmers won't have to use pesticides. For the first time, we have "borrowed" the gene that gives maize its stem strength and introduced it into the new plant. This will enable the plant to carry more grains, increasing the yield by at least 25 per cent compared to existing varieties. We hope to release it to Asian farmers by early next century.

When you started your career at the IRRI 32 years ago, the primary aim was to

* Gurdev S. Khush is Principal Plant Breeder and Head of the Division of Plant Breeding, Genetics and Biochemistry at the International Rice Research Institute (IRRI) based at Manila (the Philippines).

masterminding a new rice revolution

develop high-yielding rice varieties to prevent a food crisis. That led to the Green Revolution. Then came eco-friendly agriculture and now efforts are being made to develop genetically modified seeds. How would you describe this transition?

Asia witnessed acute food shortages in the 1960s and it was urgent to step up food production. This was achieved by developing high-yielding rice varieties like IR-8, IR-36 and IR-64 at the IRRI which matured in 110 days compared to the 180 days required for traditional varieties. This transformation, better known as the Green Revolution, helped to double rice production in Asia between 1967 and 1992, averting famine in many countries. In some countries like Indonesia, rice production trebled. However, it was realized during the process that indiscriminate use of pesticides and fertilizers caused environmental damage. So the emphasis shifted towards sustainable agriculture. Farmers were encouraged to use organic manure, compost and bio-fertilizers. Subsequently new seed varieties, genetically resistant to certain insect pests, were also developed, minimizing the use of hazardous pesticides.

On the social side, we realized that the new seed varieties were more successful in irrigated areas with good water resources. The impact of new technology was minimal in uplands and rain-fed areas, where most of the poor farmers lived. Our next challenge is to develop drought-resistant rice varieties to help those farmers living in unfavourable environments.

As a prominent actor in the Green Revolution how would you react to criticism that excessive use of fertilizers and pesticides resulted in soil degradation?

I think most of this criticism is unjustified. We were about to witness famine in Asia in the 1960s and the priority was to increase food production. So mineral fertilizers and pesticides were used to boost productivity. But there is no evidence or data to show that soil degradation occurred because of the Green Revolution process. It could have happened because of improper use of agricultural lands. Excessive use of fertilizers and pesticides and no proper drainage systems in fields during heavy rains or floods also contributed to soil degradation. Now we actively promote Integrated ▶

Farming on the edge of the city in Yunnan Province (China), below. In many Asian countries, urbanization and industrialization are steadily encroaching on cropland. China has introduced laws to stop agricultural land from being converted to use by industry and housing.

© Liba Taylor/Panos Pictures, London

▶ Pest Management, encouraging farmers to rationalize pesticide use.

There are a lot of misconceptions about the use of mineral fertilizers. Our research findings have proved that rice plants definitely need balanced nutrients to produce more grain. Whether these nutrients come from mineral fertilizers or organic manure does not matter. Look at the farmers in the U.S. and other developed countries who continue to use fertilizers and harvest higher yields. If there were problems in using mineral fertilizers, they would be the first ones to raise the alarm.

If fertilizers are not harmful why are some farmers opting for organic farming?

Some farmers go for organic farming, without using mineral fertilizers or pesticides, because it is lucrative and there is a demand for organic food in Western countries. But their production level is half of what they used to harvest before by using fertilizers. I am sure that if all farmers switched over to organic farming, current food production would be reduced by half, triggering a food crisis. In my view, organic farming is not a viable alternative but a recipe for disaster.

I am sure that if all farmers switched over to organic farming, current food production would be reduced by half, triggering a food crisis. In my view, organic farming is not a viable alternative but a recipe for disaster

Some say that many traditional rice varieties have disappeared as a result of the introduction of IRRI's new varieties, resulting in loss of genetic diversity. What is your response to this view?

It is natural for farmers to switch over to new varieties providing higher yields. As a consequence, the number of varieties in farmers' fields goes down. In the U.S., for example, farmers were growing over 50 varieties of soya bean 30 years ago but now they cultivate only five or six new high-yielding varieties. How can you stop farmers from using a new variety which gives them higher yields? It is not true that traditional seed varieties have been lost forever. We collect those varieties and save them in our germplasm bank at the IRRI. So far, about 85,000 traditional rice varieties have been collected from many parts of Asia, which were grown before the Green Revolution. Similarly countries like Indonesia, India and China also have their own seed collection centres. These will be used for generations to come when we want to develop new seed varieties.

I disagree with the view that the genetic potential of those traditional varieties is lost completely. When a new variety is developed, rice breeders incorporate genes from 30 to 40 different traditional varieties and incorporate them into the new seed. Take the case of IR-64, a very popular variety among Asian farmers. It has genes taken from at least 44 different parents. We cannot develop modern varieties without traditional varieties.

According to a UN report, global fresh water supplies are barely half of what they were 20 years ago and the shortage is likely to increase in the coming years. How can farmers cope with the water shortage?

This is going to be another major problem in future. Rice is a high water-consuming crop but we find farmers using more water than is actually required. On average, farmers use 5,000 litres of water to produce one kilogram of rice. It is not essential to use so much water. Now there are technologies available to produce one kilo of rice with as little as 1,500 to 2,000 litres of water. Unfortunately many farmers are not aware of these new trends and do not have access to the new technologies. There is a misconception among farmers that they need to maintain a few inches of water above ground level in rice fields throughout the growing period. We have shown that it is enough to keep the soil saturated with water. A new initiative needs to be launched by rice-producing countries to educate rice farmers about water management.

There is a strong demand to produce more rice to solve the food problem. However, some environmental groups complain that methane gas, which emerges out of rice fields, contributes to the greenhouse effect. How can this problem be solved?

It is true that methane emission occurs in rice fields but the problem has been exaggerated. Statistics show that only 15 per cent of global methane emission originates from paddy fields. The remaining 85 per cent comes from industrial activities worldwide.

The man **behind** the miracle

Dr Gurdev Singh Khush may not be a household name. But his rice varieties are. In the last 32 years, he and his team at the International Rice Research Institute (IRRI) in Manila, have introduced over 300 new grain varieties, including IR8, IR36, IR64 and IR72, which triggered the Green Revolution in Asia in the 1960s. Today, IRRI rice varieties and their progenies are planted in over 70 per cent of the world's rice-fields.

"Farmers were initially sceptical about our new grain varieties, which took less time to mature than traditional varieties. But our perseverance paid dividends," recalls Dr Khush. During the first 25 years of Dr Khush's programme, world rice production doubled from 256 million tonnes in 1966 to 518 million tonnes in 1990, enabling an additional 700 million people to obtain adequate nutrition.

In 1976, Dr Khush introduced IR36, called "the miracle rice" that has since become one of the world's most widely grown food crop varieties. According to IRRI estimates, IR36 has added about five million tonnes of rice annually to Asia's food supply and accounts for an additional $1 billion yearly income to Asian farmers.

What prompted Khush to take up a career in agricultural research? "I come from Punjab, in northern India. There was a lot of poverty and not enough food. My father was a farmer, and he strongly encouraged me to do something for the agricultural community," says the 64-year-old scientist. His pioneering research has won him many awards, the most notable being the World Food Prize in 1996, which he won for his contribution to "advancing human development by improving the quality, quantity or availability of the world's food supply." The prize, widely regarded as the equivalent of a Nobel Prize for agriculture, is awarded by the World Food Prize Foundation based at Des Moines (USA).

Khush is now working on new grain varieties designed to increase yields by another 25 per cent. "The mission of my life is to continue to work towards the improvement of rice, and to be able to feed more and more people," says Dr Khush who now lives in Los Banos, near Manila in the Philippines, with his wife, Dr Harwant K. Khush. ■

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● **IRRI Website**
http://www.cgiar.org/irri

Rice-producing countries

Source: FAO Rice Information

So we should first try to reduce methane emissions from industry by introducing alternative eco-friendly technologies. But you cannot stop rice production. Rice will continue to be grown because it is the food of humanity. At the IRRI we are also working on ways to minimize or eliminate methane emissions from rice fields.

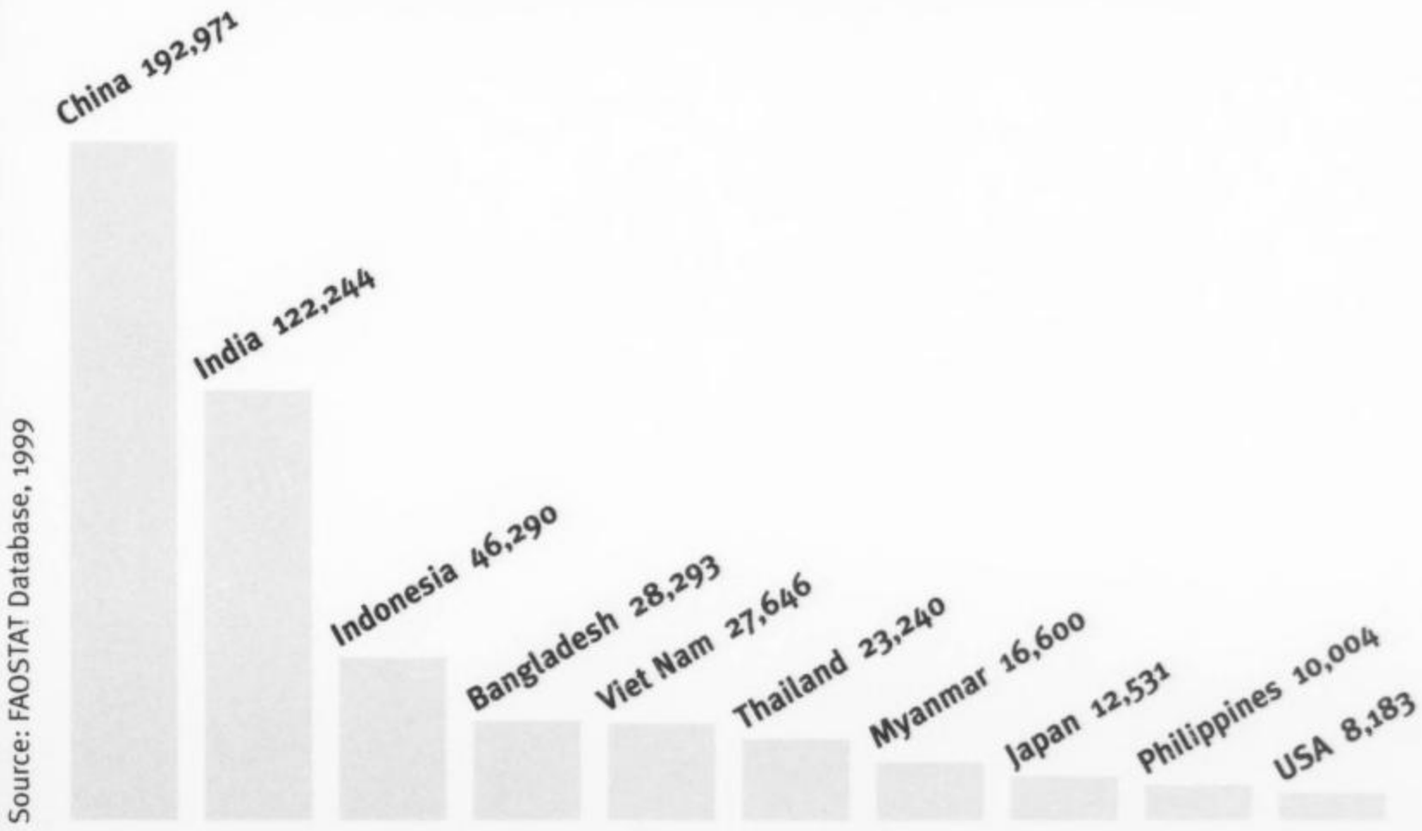
Many Asian countries talk about land reform designed to even out the distribution of farmland among farmers and labourers. Unfortunately, in many countries land reform has not become a reality for socio-political reasons. Do you believe that the present unequal distribution of land has any relevance to food production?

Equal land distribution among farmers is highly relevant because it not only reflects on food production but also on socio-economic conditions. Look at the Indian experience. In states like West Bengal and Punjab, land reforms were carried out in the 1960s and 1970s and food production in those regions has increased as a result. On the contrary, in the eastern state of Bihar most of the land is owned by a handful of landlords. This unequal land distribution is the main reason for the clashes between landowners and labourers there for the last 50 years. Bihar's average food production is also very low compared to other states. In the Philippines, land reforms were introduced in the early 1970s and since then rice lands have been owned by rice producers, not by landlords. Japan also undertook land reforms after the Second World War and food production has increased steadily since then.

Reports have shown that cultivable areas in Asia are decreasing gradually due to rapid urbanization and industrialization. What repercussions will this have in the next 25 years?

In many Asian countries, productive agricultural land is situated close to cities and towns. When the cities expand these lands become the first victims. In China, for example, agricultural land is disappearing rapidly to meet the demands of industrial and housing projects. In the 1970s, the area under rice cultivation in China was over 35 million hectares. By 1990 the figure had dropped to 31 million hectares. China doesn't have additional land which can be converted to agricultural purposes. The Chinese government is aware of this problem and has introduced strict laws to ▶

The world's top ten rice-producing countries (thousands of tonnes)



Source: FAOSTAT Database, 1999

prevent agricultural land from being converted to industrial and housing purposes.

In Indonesia, particularly in Java, 60,000 hectares of rice land are lost every year because of increasing demand for houses and factories, and in the Philippines, they lose around 10,000 hectares of rice fields for the same reasons. We should remember that rice fields being consumed by urban growth cannot simply be replaced by clearing more forests. Countries such as the Philippines don't have much forest left. To partly compensate, Asian countries should try to bring more areas under irrigation. Again that requires a lot of investment.

Scientists say that the arrival of monsoon rains has been either delayed or advanced due to global climate change, affecting farming communities in many Asian countries. What could the consequences be if the pattern continues?

It will be very destructive for agriculture if this change in the weather pattern, known as the La Niña effect, strikes again this year. In Southeast Asia last year, the monsoon was delayed by four months whereas it rained heavily during the harvest season so that rice crops were destroyed. As a result, rice farmers have suffered heavy losses in the last two years. Rice production in the Philippines and Indonesia has gone into sharp decline following the La Niña effect. I hope this continues to be a rare phenomenon, which occurs once every 10 years or more. If it happens every year then it will have a devastating effect on rice cultivation.

Has the Asian financial crisis had an impact on rice production?

The Asian financial crisis primarily affected South Korea, Thailand, Indonesia and Malaysia. In South Korea and Malaysia, the agricultural sector was unaffected, and rice production in those countries has been normal for the last two years. Thailand managed to withstand the crisis mainly because of its strength in rice cultivation. Many Thais who were working in factories moved back to rice fields following the economic crisis. As a result, the area under rice cultivation increased and Thailand was able to produce more rice than in the previous years. The Thai government has realized that rice cultivation is the country's backbone, and is paying more attention to agriculture now.

In Indonesia, the economic crisis has had an adverse impact. In the aftermath of the crisis, the cash-strapped Indonesian government stopped giving subsidies for fertilizers and fertilizer prices shot up. Many rice farmers had to abandon their crops because they simply could not afford to buy fertilizers at the new rates. Economic crisis, along with La Niña, hit rice output in Indonesia last year, reducing rice stocks to their lowest level in the last decade. Indonesia was a rice exporter until a few years ago but now imports three million tonnes a year.

What about China?

Many experts have predicted that China is likely to face a major food shortage in the next century. The population is still increasing at the rate of 1.1 per cent. It is estimated that the population growth rate will stabilize only after touching the 1.6 billion mark compared to the present 1.2 billion. That means another 400 million to 500 million more people to feed. Only 11 per cent of the total land area in China is suited to agriculture. The rest consists of mountains and deserts. So China will become the largest importer of food grains 30 years from now. ■

Interview by **Ethirajan Anbarasan**

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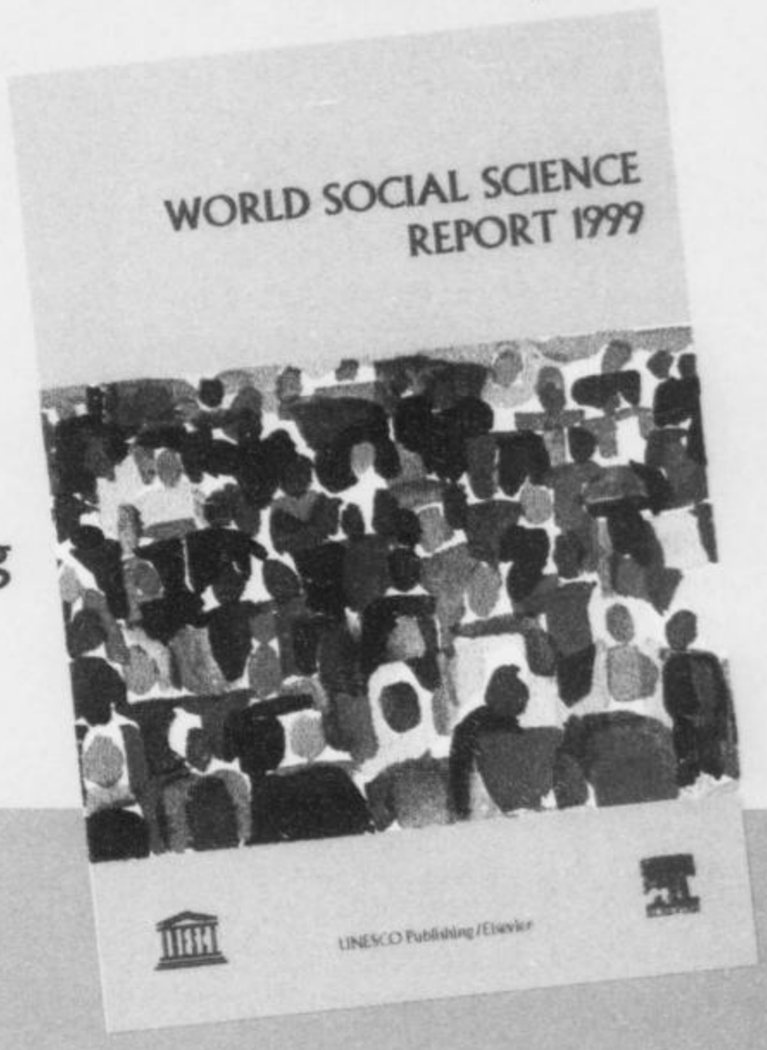

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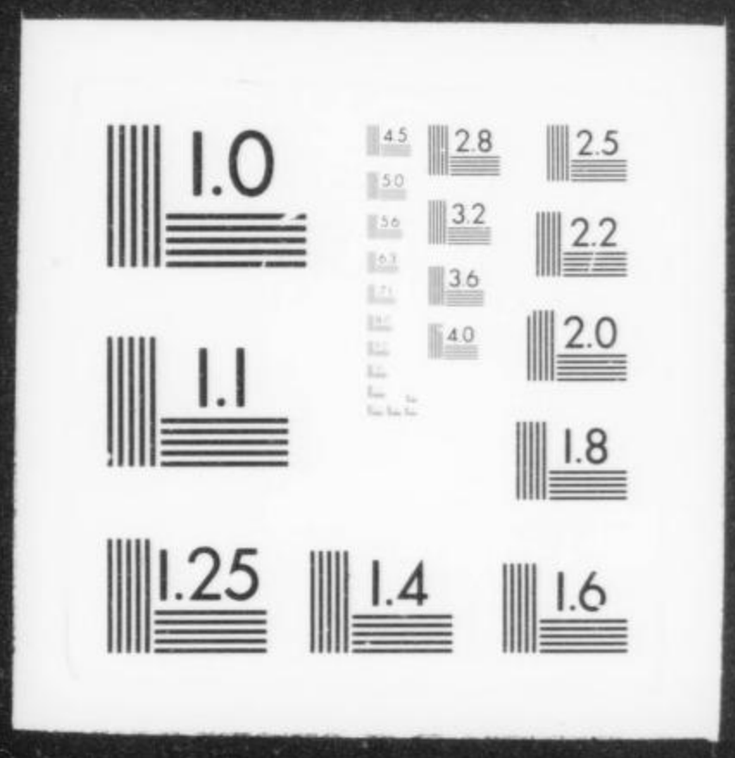
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